International Journal of Social Sciences, Language and Linguistics (2051-686X)

Navigating Change: The Evolution of EU Industrial Policy Towards Strategic Interdependence

Christian ILCUS
MSc in political science & MA in EU Studies

Doi https://doi.org/10.55640/ijssll-06-09-01

ABSTRACT

The aim of this study is to critically examine the transformation of EU industrial policy, focusing on the shift from a predominantly market-oriented governance model to one characterized by strategic interdependence. We ask how this evolution influences the EU's ability to manage dependencies, secure critical inputs, and enhance its productive capabilities in an increasingly interconnected global economy. To achieve this, we employed a mixed-methods approach, combining qualitative analysis of EU policy documents and quantitative assessments of industrial performance metrics. Our findings indicate that the integration of traditional principles, such as the Single Market and competition, with strategic measures is vital for fostering resilience and competitiveness. We identify key challenges and opportunities that arise from this new approach, emphasizing the need for a balanced strategy that promotes both openness and strategic management. Overall, we conclude that the future of EU industrial policy will hinge on its capacity to navigate geopolitical complexities while ensuring sustainable growth and innovation within its industrial sectors. The study further examines how emerging technologies, skills, infrastructure and industrial ecosystems will shape Europe's future productive capacity. It considers whether EU intervention should focus on market-making, market-shaping, or a combination of both. Particular attention is given to the allocation of public resources according to their contribution to productivity, social welfare, strategic resilience and citizen utility per euro spent. We also assess the potential benefits and risks of a more integrated industrial governance structure, including the possibility of a strategic budget line under DG Industry linking people, organisations and technology. Finally, the study argues that European industrial policy should focus less on protecting existing firms and more on creating the conditions in which globally competitive industries and high-quality employment can emerge.

Keywords: EU Industrial Policy, Strategic Interdependence, Market Governance, Economic Resilience, Policy Transformation, Qualitative Analysis, Quantitative Assessment, Stakeholder Insights, Global Economy, Supply Chain Management.

A number of great factories in the hands of rich capitalists, in which 'slaves of work' drag out their miserable existence, is not the goal of the development of the age of natural science.
-Werner von Siemens
I had to make my own living and my own opportunity. But I made it. Don't sit down and wait for opportunities to come. Get up and make them.
-Madame C.J. Walker
Piling up regulation doesn't mean we have a strategy. What we need is an industrial policy and a strategy.
-Luca de Meo, Renault
It always seems impossible until it's done.
-Nelson Mandela

INTRODUCTION

Industria comes from the Latin *industrius*, meaning "diligent, hardworking, or active." It is often connected with *indu-/endo-* ("within, in") and *struere* ("to build, arrange, put together"). Thus, *industria* originally referred to purposeful effort, diligence, and active work, and only later came to mean manufacturing and economic production.

Industrial policy has returned to the centre of European economic policymaking. For much of the post-Cold War period, the European Union's economic model was built around market integration, competition, trade liberalisation and the removal of barriers to cross-border economic activity. Industrial competitiveness was

expected to emerge primarily from the functioning of the Single Market, technological innovation and exposure to global competition. The state was not absent, but its role was largely understood in terms of creating favourable framework conditions rather than directing the development of particular industries. The renewed prominence of industrial strategy therefore represents an important change in the orientation of European economic governance. As Aiginger and Rodrik (2020) argue, the contemporary revival of industrial policy reflects a broader recognition that markets alone may not generate the productive capabilities, technological capacity and structural transformation required for long-term economic development.

Throughout the history of Europe, industry has played an important role in the economy. In ancient times, production was mainly based on agriculture and handicrafts. During the Middle Ages, towns became important centers of trade and craft production. The Industrial Revolution began in Britain in the 18th century. It introduced machines, factories, and new methods of production. Industry then spread rapidly across Europe during the 19th century.It created jobs and increased trade, wealth, and urbanization. Industrial countries also became stronger politically and militarily. Competition for resources and markets contributed to European imperialism. Today, industry remains essential to Europe's economy and global competitive-ness.

Industry has always been Europe's great machine for making money—and, occasionally, trouble. It began with coal and steel, because apparently the best way to prevent war was to share the materials needed to make one. The European Coal and Steel Community turned former enemies into economic partners. Factories became bridges between countries, though considerably noisier ones. Trade increased, borders mattered less, and Europe slowly learned that cooperation could be profitable. The Single Market later extended this idea to goods, services, capital, and people. Industry therefore helped turn European unity from an ambitious dream into an economic reality. Of course, Europeans still managed to disagree—usually with impressive efficiency. Today, industry remains essential to Europe's jobs, technology, and competitiveness. In short, Europe discovered that sometimes the best way to stop fighting is to start doing business together.

Since the founding of the European Coal and Steel Community, the story of Europe's industrial policy has unfolded through successive transformations, each born from the pressures and uncertainties of its time. What began in the shadow of war, with coal and steel placed beneath the watchful hand of supranational authority, was never destined to remain confined to those dark furnaces and ironworks. As the European project matured, its attention turned towards the creation of a common market, where industry would be guided less by direct intervention than by the quiet forces of competition and integration. Yet the passage of time brought new anxieties: technological upheaval, intensifying global competition, and the growing vulnerability of European industry to forces beyond its borders. Thus, industrial policy gradually returned to the centre of the European project, taking on a new and more ambitious character. Today, amid the uncertain promise of the green and digital transitions, the EU once again seeks to shape its industrial destiny, pursuing innovation, strategic autonomy and economic resilience. Its history is therefore not one of simple progress, but of retreat and return—a continual struggle between the freedom of the market and the desire to protect and shape Europe's industrial future.

Although important uncertainties and challenges persist, such as differing national industrial interests, limited EU competences and the tension between market integration and strategic intervention, EU industrial policy has nevertheless assumed an increasingly prominent role. Its evolution has not been a linear one, but rather a gradual process shaped by successive economic crises, technological transformations and shifts in the global balance of power. What began with the Coal and Steel Community as a narrowly focused effort to manage two strategic industries gradually expanded into a broader project centred on creating a European market and strengthening competitiveness. Over time, however, the limitations of relying primarily on market forces became increasingly apparent. Globalisation, technological competition and growing dependencies on external suppliers pushed industrial policy back towards the centre of the European agenda. The green and digital transitions then added a new dimension, requiring the EU not only to compete in global markets but also to shape the direction of industrial change. More recently, disruptions to supply chains, geopolitical tensions and concerns over strategic dependencies have further encouraged the EU to adopt a more active approach. As a result, EU industrial policy today sits somewhere between its earlier market-oriented character and a renewed ambition to shape Europe's industrial future. Its story is therefore one of gradual transformation: from managing coal and steel, to building markets, to promoting competitiveness, and ultimately towards resilience, strategic autonomy and economic security.

The hope is for a Europe that need not surrender its industrial destiny to the shifting winds of distant powers, but may instead possess the strength to shape its own future. Yet that hope is shadowed by uncertainty, for the

path towards strategic autonomy is strewn with competing interests, limited resources and the enduring tension between national ambition and European unity.

For the European Union, this return has been particularly significant because industrial policy has traditionally occupied an ambiguous position within the EU legal and economic order. Article 173 TFEU provides an explicit basis for supporting industrial competitiveness, but the Union does not possess a comprehensive industrial-policy competence comparable to that of a national government. Instead, industrial objectives are pursued through a combination of internal-market regulation, competition policy, research and innovation, environmental and energy policy, trade, infrastructure, investment and increasingly economic-security instruments. The result is a dispersed system in which industrial strategy is constructed across several policy domains rather than through a single European industrial authority.

The renewed interest in industrial policy reflects a broader reconsideration of the relationship between markets and the state. Traditional economic approaches often treated industrial policy with caution because selective government intervention could distort competition, protect inefficient firms or produce rent-seeking. The European integration project reinforced this orientation by placing competition, market openness and the free movement of goods, services, capital and people at the centre of the European economic model. Industrial policy was consequently associated primarily with horizontal measures designed to improve the general conditions for business rather than with direct sectoral intervention.

This distinction has increasingly weakened. Contemporary industrial policy is concerned not only with improving framework conditions but also with influencing the direction of technological development, investment and productive capacity. Aiginger and Rodrik (2020) describe this broader understanding as a return to industrial policy in which governments seek to shape structural transformation while addressing social, environmental and technological objectives. Similarly, Juhász, Lane and Rodrik (2023) demonstrate that industrial policy has historically been much more widespread and economically significant than conventional accounts suggest.

Within the EU, this shift can be seen in the development of instruments targeting semiconductors, critical raw materials, batteries, clean technologies and strategic infrastructure. These policies do not represent a complete rejection of market-based integration. Rather, they indicate that European policymakers increasingly regard certain productive capabilities as too important to be left entirely to market forces. Industrial strategy has consequently become a means of managing the relationship between market efficiency, technological development and strategic resilience.

The return of industrial strategy is closely connected to concerns about the competitiveness of the European industrial model. European manufacturing has historically benefited from an integrated Single Market, highly developed infrastructure, skilled labour, technological capabilities and access to global markets. However, the conditions supporting this model have become increasingly challenging. European firms face high energy costs, demographic pressures, intense international competition, slower productivity growth and substantial investment requirements associated with digitalisation and decarbonisation.

The problem is therefore not simply that European industry faces stronger foreign competition. It is that several structural transformations are occurring simultaneously. The green transition requires major investment in new production systems, while digitalisation is changing the technological foundations of manufacturing. At the same time, global value chains are being reorganised and international economic relations are becoming more politically contested. Draghi (2024) argues that Europe faces a structural competitiveness challenge requiring significantly greater investment in innovation, energy, infrastructure and strategic capabilities.

This crisis has encouraged a reassessment of the assumptions underlying the European industrial model. The objective is no longer simply to maintain Europe's position within existing global value chains. Increasingly, the EU seeks to strengthen its capacity to shape, diversify and, where necessary, partially internalise critical parts of those value chains. This does not necessarily imply economic self-sufficiency. Instead, it points towards a model in which Europe seeks to remain open to global markets while reducing excessive dependencies in strategically important areas.

The transformation of industrial policy has also been driven by changes in the international economic environment. The post-Cold War period was characterised by deepening globalisation, increasing trade integration and the expansion of complex international production networks. European firms benefited substantially from this system, particularly through access to global markets, lower-cost inputs and specialised production capabilities

abroad.

However, the increasing politicisation of economic relations has challenged the assumption that economic interdependence is inherently stabilising. Trade, investment, technology and access to resources have increasingly become instruments of geopolitical influence. The United States–China relationship, technological competition, trade restrictions and growing concerns over strategic supply chains have demonstrated that economic interdependence can create vulnerabilities as well as efficiency gains.

This has encouraged the EU to develop concepts such as **open strategic autonomy**. The objective is not to abandon international economic integration but to ensure that European openness does not generate unacceptable strategic dependencies. As European policy increasingly recognises, resilience requires both domestic capabilities and diversified international relationships. Industrial policy has therefore acquired an external dimension that was less prominent in earlier approaches.

The emerging focus of EU industrial policy, as it evolves beyond a predominantly market-regulatory approach, is increasingly centred on strategic intervention and the management of interdependence. Contemporary industrial policy seeks not only to improve competitiveness but also to strengthen Europe's capacity to withstand economic, technological and geopolitical disruptions. Strategic resilience has become a central objective, reflected in efforts to diversify sources of supply, reduce critical vulnerabilities and strengthen productive capabilities in strategically important sectors. Closely linked to this is the growing emphasis on economic security, which extends industrial policy beyond traditional concerns of efficiency and market integration to include secure access to critical raw materials, energy, advanced technologies and essential infrastructure.

This transformation also reflects a growing recognition that European competitiveness can no longer be secured solely through internal policies. The productive capacity of European industry increasingly depends upon resources, technologies, energy supplies, transport corridors and markets located beyond the Union's borders. As a result, industrial policy is becoming more closely integrated with trade policy, investment policy, connectivity initiatives and external partnerships. The distinction between internal and external economic policy is becoming less pronounced as both are increasingly directed towards common strategic objectives.

At the same time, EU industrial policy is attempting to balance economic efficiency with resilience. While market integration and specialisation have generated substantial economic benefits, recent crises have exposed the vulnerabilities that can arise from excessive dependence on concentrated suppliers, fragile supply chains or politically sensitive external relationships. The emerging approach therefore seeks to preserve the advantages of openness while reducing exposure to strategic risks. Rather than pursuing complete self-sufficiency, the EU is increasingly focused on shaping the conditions under which interdependence operates.

This has given rise to what may be described as **managed strategic interdependence**. The objective is not to eliminate economic interdependence but to ensure that it remains compatible with strategic choice. Dependencies are not inherently problematic; they become problematic when they limit Europe's ability to act independently or expose critical sectors to disruption and coercion. The emerging model therefore combines market openness with strategic intervention, creating a hybrid form of industrial governance in which public policy actively supports the development of productive capacity, technological capability and resilient supply networks.

Managed strategic interdependence also redefines the EU's approach to external partnerships. Rather than viewing external relationships simply as channels through which goods and resources flow, the EU increasingly treats them as strategic assets that contribute to industrial resilience, competitiveness and long-term transformation. The emphasis is placed on maintaining strategic choice by ensuring that Europe can determine where it depends, how much it depends and with whom it depends. Diversification becomes a means of preserving autonomy, while external partnerships become instruments for strengthening resilience.

This approach encourages the development of long-term industrial partnerships with strategically important countries and regions. Such relationships extend beyond access to resources and encompass investment, infrastructure, technology cooperation, industrial development and value-chain integration. The objective is to create partnerships that generate mutual benefits while reducing vulnerabilities associated with excessive concentration or dependence. In this way, external relationships become part of the broader architecture of European industrial strategy.

The concept also provides a framework for reconciling openness with strategic autonomy. Europe remains deeply integrated into the global economy and continues to benefit from international trade, investment and

technological exchange. However, openness is increasingly accompanied by measures designed to ensure that external dependencies do not undermine European resilience. Strategic autonomy is therefore understood not as isolation from global markets but as the capacity to shape and govern the terms of participation within them.

Consequently, domestic industrial capacity and external partnerships are becoming increasingly interconnected. The effectiveness of European industrial policy depends not only on what is produced within the Union but also on how successfully the EU manages the networks of resources, technologies, infrastructure, finance and markets upon which production depends. External relationships are therefore no longer peripheral to industrial policy; they have become one of its essential dimensions.

Within this framework, the EU seeks to secure a range of conditions necessary for long-term industrial competitiveness. These include reliable access to critical raw materials, stable and diversified energy supplies, resilient and diversified global supply chains, access to international markets and the ability to attract productive investment. Technological cooperation with international partners is becoming increasingly important for maintaining innovative capacity and technological leadership, while investments in transport, energy and digital infrastructure are viewed as essential components of industrial competitiveness.

The EU is also placing greater emphasis on economic-security partnerships that strengthen resilience against supply disruptions, economic coercion and geopolitical instability. Such partnerships are designed not only to secure access to strategic inputs but also to support industrial development, technological cooperation and value creation across international production networks. Equally important is the pursuit of reciprocity in international markets, ensuring that European firms can compete under fair conditions and benefit from open and predictable economic relationships.

Theese developments point towards a broader transformation of EU industrial policy. The objective is no longer limited to improving competitiveness through market integration and regulatory efficiency. Instead, the EU is seeking to construct an industrial strategy capable of combining competitiveness, innovation, resilience, sustainability and economic security within a coherent framework. The resulting model is neither protectionist nor purely market-driven. It is a strategic approach to industrial development that seeks to preserve the benefits of openness while ensuring that Europe retains the capacity to act, adapt and prosper within an increasingly complex and contested global economy.

We argue that the transformation of EU industrial policy signifies a significant shift from a predominantly market-oriented governance model to one that emphasizes strategic interdependence. This evolution does not imply that the EU is abandoning the principles of the Single Market, competition, or international trade. Instead, it highlights a growing integration of these foundational elements with proactive measures aimed at managing strategic dependencies, securing critical inputs, and enhancing European productive capabilities. By adopting this approach, the EU seeks to create a more resilient industrial framework that not only supports long-term competitiveness but also effectively navigates the complexities of global interdependence.

The paper therefore proposes that the external dimension of industrial policy should be treated as an integral component of contemporary EU industrial strategy rather than as a separate field of trade or foreign economic policy. The increasing importance of critical raw materials, energy security, technological supply chains and connectivity demonstrates that European industrial capacity depends partly on relationships beyond the EU's territorial boundaries.

The scientific contribution lies in connecting two bodies of literature that are often analysed separately: EU industrial-policy scholarship and research on geoeconomics, strategic interdependence and economic security. The paper argues that their intersection provides a more comprehensive explanation of the current transformation of European industrial strategy.

The central puzzle follows directly from this argument:

If the EU cannot achieve industrial resilience through domestic production alone, how does it organise the external economic relationships required to sustain its industrial transformation?

This question moves beyond conventional approaches that examine industrial policy primarily through domestic regulation, competition or industrial support. European industrial capacity increasingly depends on resources, technologies, energy and infrastructure located outside the EU. The question is therefore not whether Europe can eliminate external dependence, but how it can organise and govern interdependence in strategically important areas.

The paper consequently examines whether the emerging EU approach constitutes a new form of external industrial

strategy, in which trade, investment, connectivity, resource partnerships and economic diplomacy increasingly serve industrial objectives.

The scope of the paper is limited to the transformation of EU industrial strategy and its external dimension. It focuses on the period from the emergence of renewed industrial-policy thinking in the aftermath of the global financial crisis to the post-2022 period, with particular attention to the COVID-19 pandemic, Russia's invasion of Ukraine, the Draghi report, the Competitiveness Compass and the Clean Industrial Deal.

The analysis concentrates on strategic sectors and policy areas where the relationship between industrial competitiveness and external dependence is particularly visible, including critical raw materials, semiconductors, clean technologies, energy and strategic infrastructure.

The primary objective is to explain how the EU's industrial-policy framework has evolved from a predominantly market-oriented approach towards a more strategic model. A second objective is to examine how economic-security considerations have altered the priorities and instruments of European industrial policy. A third objective is to analyse how external dependencies have become incorporated into EU industrial strategy. Finally, the paper seeks to develop an analytical framework for understanding the EU's emerging approach as one based on managed strategic interdependence rather than economic self-sufficiency.

Research Questions

The main research question is:

How is the transformation of EU industrial policy producing a new form of external industrial strategy based on strategic interdependence, connectivity and international partnerships?

This question is addressed through the following sub-questions:

1. How has EU industrial policy evolved from market regulation towards strategic intervention?

2. How has economic security transformed the objectives and instruments of EU industrial policy?

3. How does dependence on critical resources, technologies and external supply chains externalise European industrial strategy?

4. How are trade, investment, connectivity and international partnerships increasingly incorporated into EU industrial policy?

5. To what extent does the emerging framework represent a shift from economic openness towards managed strategic interdependence?

The significance of the study lies in its attempt to explain an important transformation in European economic governance. Existing research has examined the revival of industrial policy, European competitiveness, strategic autonomy and economic security, but these areas are often treated as distinct policy debates. By bringing them together, the paper provides a framework for understanding how internal industrial policy increasingly depends upon external economic relationships.

The study is also significant because it challenges the assumption that industrial resilience necessarily requires greater economic self-sufficiency. In an interconnected global economy, complete autonomy is neither realistic nor necessarily desirable. The more relevant question is how strategic dependencies can be diversified, governed and embedded within resilient international partnerships.

The paper therefore conceptualises the emerging EU model as strategic interdependence: an approach in which Europe seeks to remain economically open while reducing excessive dependencies, strengthening critical capabilities and organising external relationships around long-term industrial objectives.

This perspective contributes to the broader debate on the future of European economic governance by showing that the return of industrial strategy is not simply a return to traditional protectionism or national industrial planning. Instead, it represents the emergence of a more complex model in which industrial policy, economic security, trade, investment, connectivity and international partnerships increasingly operate as interconnected components of European strategy.

Systematic Literature Review: EU Industrial Policy and Strategic Interdependence

The literature on European Union (EU) industrial policy has undergone a substantial transformation over the past two decades. Earlier scholarship largely approached industrial policy through the distinctive institutional framework of the European project: the completion of the Single Market, the preservation of competition, the removal of barriers to trade and investment, and the creation of a level playing field across Member States.

Within this framework, EU industrial policy was generally understood as predominantly horizontal, market-enhancing and constrained by the EU's competition and state-aid regimes (Pelkmans, 2006; Aiginger, 2014; Edler and Wydra, 2018).

More recent scholarship, however, identifies a significant revival of industrial policy. The global financial crisis, the COVID-19 pandemic, intensifying US–China strategic competition, disruptions to global supply chains and Russia's invasion of Ukraine have altered the economic and geopolitical environment in which European industrial policy operates. Industrial policy is increasingly discussed not only in terms of productivity and competitiveness, but also in relation to technological sovereignty, strategic autonomy, economic security, supply-chain resilience, energy security and geopolitical power (Aiginger and Rodrik, 2020; Juhász, Lane and Rodrik, 2023; European Commission, 2021; European Commission, 2023).

The approach of Mcnamara (2024) is particularly useful for analysing the EU's emerging industrial policy as part of a broader geopolitical and political transformation. She argues that the EU is moving beyond the neoliberal model of market-making based primarily on liberalisation, competition, and the removal of market distortions towards a more interventionist model of market-shaping. EU industrial policy therefore represents more than a set of economic measures: it reflects a growing capacity of European institutions to direct investment, support strategic sectors, regulate markets, and pursue objectives related to security, resilience, sustainability, and technological sovereignty. A central analytical insight is that this transformation is shaped by contestation within the European Commission, where different Directorates-General and political actors hold competing views about the appropriate balance between competition, industrial intervention, trade openness, and climate objectives. Industrial policy consequently emerges through institutional bargaining rather than from a single coherent European strategy. McNamara also highlights the influence of national economic traditions, particularly the growing prominence of French dirigisme, in shaping the direction of European industrial policy. This suggests that the development of EU industrial policy reflects an interaction between supranational institutions and member-state preferences. The geopolitical turn is therefore embedded within the institutional politics of industrial policy itself. At the same time, the expansion of industrial policy contributes to the politicisation of the EU because decisions about which sectors to support, where investment should be located, and which firms or technologies should receive public resources inevitably create winners and losers.

This distinguishes the emerging industrial-policy model from the earlier Single Market paradigm, which was more strongly associated with market neutrality and the creation of a level playing field. McNamara consequently raises an important question about the democratic legitimacy of EU industrial policy, particularly because increasingly consequential economic decisions are being made at European level without the same forms of electoral accountability that exist within national states. The EU's industrial policy thus creates a tension between expanding political capacity and limited mechanisms of democratic representation. Its legitimacy will depend not only on whether industrial interventions deliver economic and strategic benefits but also on whether European citizens perceive these interventions as transparent, accountable, and collectively beneficial. McNamara further argues that industrial policy is closely connected to the EU's changing international role. Instruments designed to strengthen European technological capacity, secure supply chains, reduce strategic dependencies, and support the green transition increasingly serve both economic and geopolitical objectives. This represents a shift towards geoeconomics, in which market instruments are deployed to pursue strategic power and resilience rather than efficiency alone. The EU's approach to China, critical technologies, energy, and supply-chain security illustrates how industrial policy is becoming an instrument of geopolitical strategy.

Yet this transformation does not necessarily imply a retreat from globalisation, since the EU continues to pursue an open but more strategically managed economic relationship with the global economy. The key analytical question is therefore whether the new industrial policy can reconcile economic openness with strategic autonomy while maintaining the integrity of the Single Market. McNamara's framework ultimately links EU industrial policy to polity-building: as the Union acquires greater capacity to shape markets and pursue strategic economic objectives, it simultaneously develops new forms of political authority. The success of this transformation will depend on the EU's institutional capacity, the ability to manage conflicts among member states and Commission actors, and the democratic legitimacy of its increasingly interventionist role. EU industrial policy should therefore be understood not simply as an economic response to global competition, but as a potentially transformative process through which the EU is redefining its political authority and geopolitical position.

The contemporary literature can therefore be understood as several overlapping strands rather than as a single research tradition. One strand examines the traditional European model of market integration and horizontal

industrial policy. A second addresses the international revival of industrial policy and the return of more targeted intervention. A third focuses on European strategic autonomy, economic security and resilience. A fourth examines global value chains and external dependencies, while a growing body of work considers the external dimension of EU industrial strategy through trade, investment, resource partnerships and international connectivity. Together, these strands raise a broader question: whether recent developments represent a fundamental transformation of the European industrial-policy model or an adaptation of existing instruments to a changing international environment.

The traditional literature emphasises the distinctive institutional and political conditions under which industrial policy is conducted at European level. Unlike national industrial policies, EU industrial policy developed within a supranational system in which competition policy, trade policy and the Single Market occupy central positions. This contributed to what has broadly been described as a horizontal model of industrial policy, in which the EU sought to improve the general conditions under which firms operate rather than systematically selecting national champions or directing investment towards particular industries (Pelkmans, 2006; Aiginger, 2014).

Within this model, industrial policy focused on competition, market integration, research and innovation, infrastructure, skills, regulatory harmonisation and access to finance. The Single Market itself could therefore be interpreted as an industrial-policy instrument because the removal of national barriers expanded market size, increased competitive pressure and enabled firms to exploit economies of scale. The underlying assumption was that stronger competition and market integration would improve allocative efficiency and productivity while allowing European firms to compete more effectively internationally.

Yet this approach contained a persistent tension. Integration and competition could improve efficiency, but excessive reliance on market mechanisms could also leave European firms exposed to competitors operating under different institutional, financial and strategic conditions. The literature on European industrial policy has consequently long debated the appropriate balance between market neutrality and strategic intervention (Aiginger, 2014; Warwick, 2013). This tension has become more significant as the competitive strategies of major economic powers have increasingly combined market mechanisms with extensive state support.

The international revival of industrial policy has substantially reshaped this debate. For several decades, industrial policy was treated with considerable scepticism in mainstream economic policy discussions because of concerns about government failure, rent-seeking, political capture and inefficient allocation of resources. The resulting preference was for horizontal policies that corrected market failures without directing economic activity towards particular sectors. More recent scholarship has challenged this narrow understanding of industrial policy. Aiginger and Rodrik (2020) argue that contemporary industrial policy should be understood more broadly as a process of shaping the productive structure of an economy and addressing coordination problems that markets alone may not resolve. Juhász, Lane and Rodrik (2023) similarly demonstrate that industrial policy has historically been more widespread and economically significant than conventional accounts suggest.

This literature is particularly relevant to the EU because it challenges the assumption that industrial policy necessarily conflicts with competition and market integration. Industrial policy can instead be understood as an attempt to shape the conditions under which markets and productive capabilities develop. The relevant question is therefore no longer simply whether industrial policy should exist, but which forms of intervention are capable of generating additional productivity, innovation and productive capacity without creating persistent inefficiencies.

The evolution of EU policy reflects this broader intellectual shift. Rather than abandoning horizontal policies, the Union has increasingly complemented them with targeted interventions in areas considered strategically important, including semiconductors, batteries, clean technologies, critical raw materials, digital technologies and defence. The emerging model is therefore better characterised as a hybrid system combining horizontal market-enabling policies with targeted strategic intervention (European Commission, 2021; European Commission, 2023).

Competitiveness and productivity remain central to this transformation. A substantial body of literature identifies weak productivity growth, comparatively high energy costs, fragmented capital markets, insufficient investment in certain technologies, regulatory barriers and difficulties in scaling innovative firms as structural challenges for the European economy (Draghi, 2024; European Commission, 2024). From this perspective, industrial policy is justified where markets alone fail to generate sufficient investment in activities associated with significant positive externalities.

Research and development represents a particularly important example. Firms may underinvest in innovation

because they cannot capture all of the benefits generated by technological knowledge. Similar arguments apply to infrastructure, skills, digital technologies and emerging strategic industries. Public intervention can therefore address coordination failures, reduce investment risk and create the conditions under which private capital becomes viable (Aiginger and Rodrik, 2020; Juhász, Lane and Rodrik, 2023).

This literature places particular importance on the relationship between public investment and private investment mobilisation. The effectiveness of industrial policy cannot therefore be evaluated simply according to the amount of public money committed. A central issue is whether public intervention generates investment that would not otherwise have occurred. This concept of additionality is particularly relevant to EU industrial policy because the European Union operates with constrained common fiscal resources and relies heavily on the mobilisation of Member-State and private capital.

The literature on strategic autonomy represents perhaps the most important conceptual development in contemporary EU industrial-policy research. Strategic autonomy initially emerged predominantly within foreign-policy and security debates but has increasingly expanded into economic, technological and industrial domains. European strategic autonomy is generally not understood as complete self-sufficiency. Rather, it concerns the capacity of the EU to act independently when necessary while retaining the ability to cooperate with external partners (Borrell, 2020; Tocci, 2021).

This distinction is important because the European economy remains deeply integrated into global markets. International trade, foreign investment and global production networks remain essential to European prosperity. Strategic autonomy therefore does not necessarily imply autarky. Instead, the emerging literature increasingly emphasises the concept of managed interdependence: maintaining the benefits of openness while reducing vulnerabilities associated with excessive concentration in strategically important dependencies (Borrell, 2020; European Commission, 2021).

This broadens the objectives of industrial policy. Productivity and competitiveness remain fundamental, but they are increasingly joined by resilience, security and the preservation of strategic industrial capabilities. The result is a conception of industrial policy in which economic efficiency and geopolitical considerations are increasingly interconnected.

The literature on economic security and geoeconomics reinforces this development. Farrell and Newman's (2019) concept of "weaponised interdependence" demonstrates how states can exploit their positions within global economic networks to exercise political power. Globalisation therefore does not eliminate geopolitical competition; instead, economic networks can themselves become instruments of geopolitical influence. This insight is particularly important for Europe because many strategically important sectors depend upon concentrated external suppliers.

European dependence on external sources of energy, critical minerals, advanced technologies and strategic components can create vulnerabilities that conventional measures of economic efficiency do not capture. A supply chain may be highly efficient under normal market conditions while simultaneously generating substantial geopolitical risks. The literature following the COVID-19 pandemic and Russia's invasion of Ukraine has consequently placed increasing emphasis on resilience (Farrell and Newman, 2019; European Commission, 2021; Alcidi et al., 2023).

Resilience should not, however, be equated with producing everything domestically. Rather, it concerns the capacity to absorb, adapt to and recover from external shocks. Policy responses can include supplier diversification, strategic inventories, domestic production capacity, international partnerships, substitution and recycling. The central policy challenge is therefore to balance efficiency with resilience. Highly concentrated supply chains may minimise costs under stable conditions, whereas more diversified systems may reduce exposure to severe disruptions.

The literature on global value chains provides a further foundation for understanding this transformation. European industry is deeply embedded in international production networks in which intermediate goods, raw materials, energy, technology and components cross borders multiple times before reaching final consumers. Such integration can generate productivity gains and enable firms to specialise according to comparative advantage (Gereffi, Humphrey and Sturgeon, 2005; Baldwin and Evenett, 2020).

At the same time, global value-chain integration creates dependencies. The COVID-19 pandemic demonstrated how disruptions in production networks can affect European firms, while the energy crisis following Russia's invasion of Ukraine demonstrated the strategic consequences of concentrated external dependence. The literature therefore increasingly distinguishes between interdependence and vulnerability. Interdependence is not inherently problematic; vulnerability arises when

dependencies are concentrated in politically sensitive sectors, geographically concentrated, difficult to substitute or controlled by actors whose interests may diverge from those of the EU.

Critical raw materials illustrate this challenge particularly clearly. European ambitions in clean energy, digitalisation and advanced manufacturing depend on inputs that are often sourced from a limited number of external suppliers. Industrial policy must therefore address not only manufacturing capacity within Europe but also extraction, processing, recycling, substitution and international partnerships (European Commission, 2023; Alcidi et al., 2023).

Technology policy has consequently become increasingly inseparable from industrial policy. The literature on technological competition highlights the strategic significance of semiconductors, artificial intelligence, advanced manufacturing, biotechnology and clean technologies. These sectors generate spillovers throughout the economy and can possess strategic significance extending beyond their immediate commercial value. Technological capabilities can therefore become strategic capabilities.

This has encouraged a shift in the research question from whether Europe is competitive in existing industries towards whether Europe possesses the capabilities necessary to shape future technological trajectories. The industrial-policy literature consequently emphasises complementarities between research, innovation, finance, infrastructure, skills and industrial production. Scientific research does not automatically translate into commercial success. Knowledge must be transformed into technologies, technologies must be scaled through investment, and firms must possess the skills and infrastructure required to adopt them. Industrial-policy outputs are therefore interdependent rather than independent (Aiginger and Rodrik, 2020; Juhász, Lane and Rodrik, 2023).

Another increasingly important strand concerns the external dimension of EU industrial policy. Traditional approaches largely conceptualised industrial policy as a domestic policy concerned with the competitiveness of European firms. Contemporary scholarship increasingly recognises that European productive capacity depends on relationships extending beyond the Union.

Trade agreements, foreign direct investment, international partnerships, development cooperation, connectivity initiatives and resource diplomacy can all contribute to industrial resilience. This is particularly relevant where domestic production is economically or environmentally impractical. In such circumstances, reliable external partnerships may provide greater resilience than an attempt to achieve complete domestic production.

This development creates an increasingly close relationship between industrial policy and foreign policy. Trade policy can serve industrial objectives; investment screening can address economic-security concerns; resource partnerships can support strategic supply chains; and international connectivity can strengthen the resilience of European production networks. EU industrial policy is consequently acquiring an increasingly geoeconomic dimension, in which economic instruments are deployed partly in response to geopolitical objectives (Farrell and Newman, 2019; Borrell, 2020; European Commission, 2021).

At the same time, the literature highlights important institutional and political-economy constraints. The EU does not possess the same fiscal and political capacity as a unitary nation-state, and industrial policy remains distributed between European institutions and Member States. Competition policy, state-aid rules, fiscal constraints and different national industrial structures all influence the effectiveness of European intervention (Aiginger, 2014; Schmitz, 2023).

This creates a fundamental tension between European objectives and national implementation. Member States possess very different fiscal capacities. If industrial policy relies excessively on national subsidies, wealthier Member States may be able to support domestic firms more extensively than poorer Member States. This could fragment the Single Market and undermine European cohesion. The literature therefore highlights the importance of European coordination and common financing in ensuring that industrial policy produces European rather than purely national benefits.

This raises a broader political-economy question: whether strategic industrial capacity should increasingly be understood as a European public good. If the benefits of investment in technologies, infrastructure, energy security or strategic production extend across national borders, there may be a strong rationale for European-level intervention and financing.

A central disagreement in the literature consequently concerns whether recent developments constitute a genuine transformation of EU industrial policy or merely an adaptation of the existing model.

The continuity perspective argues that the fundamental structure of European economic governance remains intact. The Single Market, competition policy, trade openness and market-based allocation of resources continue to define the European economic model. From this perspective, recent initiatives represent adjustments within an established institutional framework rather than a fundamental departure from it (Aiginger, 2014).

The transformation perspective argues that the EU has entered a new phase in which strategic intervention has become an accepted and increasingly necessary component of economic governance. The pandemic strengthened concerns about supply-chain resilience, Russia's invasion of Ukraine elevated energy and economic security, US–China competition intensified pressure for technological sovereignty, and the green transition created new strategic industries and dependencies. The increasing use of state aid, strategic investment programmes and targeted industrial initiatives provides evidence of a greater willingness to intervene directly in markets (European Commission, 2021; European Commission, 2023; Draghi, 2024).

The most convincing interpretation may lie between these two positions. The EU is neither abandoning its traditional market-based model nor returning to the state-led industrial planning associated with earlier industrial-policy regimes. Instead, it appears to be developing a hybrid model in which competition and market integration coexist with targeted intervention designed to secure strategic capabilities.

This emerging model can be synthesised through a broader causal framework. EU industrial policy begins with financial and institutional inputs, including EU budgetary resources, Member-State funding, EIB finance and private capital. These inputs generate investment mobilisation, with the critical question being whether public resources produce additional investment rather than merely substituting for private spending.

Mobilised finance then produces industrial outputs, including research, infrastructure, productive capacity, technologies, skills and strategic projects. These outputs generate economic outcomes such as innovation, productivity, competitiveness, investment, resilience and industrial capacity. These outcomes subsequently contribute to broader impacts, including higher potential GDP, employment, sustainability and strategic autonomy.

The relationship is not purely linear. Feedback mechanisms operate throughout the system. Successful innovation can attract further investment; investment can increase productive capacity; greater productive capacity can improve competitiveness; competitiveness can generate additional investment; and greater resilience can reduce the probability that external shocks interrupt the process. Industrial policy is therefore better understood as a dynamic system in which economic and strategic outcomes reinforce one another.

Several gaps remain within the literature. Much existing research examines individual instruments or policy areas rather than the overall causal effectiveness of EU industrial policy. There is comparatively less systematic research connecting budgetary inputs to investment mobilisation, industrial outputs, productivity and ultimately GDP.

The concept of additionality also remains insufficiently developed at the aggregate European level. Establishing whether EU resources generate genuinely additional investment is methodologically difficult but essential for determining whether public intervention creates new productive capacity or simply displaces existing private investment.

Strategic autonomy is similarly often discussed conceptually rather than measured systematically. More research is required to distinguish economically beneficial interdependence from strategically dangerous dependence and to develop indicators capable of measuring changes in European resilience.

The literature also frequently treats competitiveness, resilience and strategic autonomy as separate objectives. In practice, however, these dimensions may reinforce one another. A stronger European industrial base can simultaneously increase productivity, reduce external vulnerability, strengthen technological capabilities and improve geopolitical bargaining power. The same investment can therefore generate both economic and strategic returns.

A further gap concerns the limited integration between industrial-policy research and macroeconomic growth theory. Greater attention should be given to the relationship between industrial-policy interventions and potential GDP rather than focusing exclusively on short-term investment, employment or output effects. The ultimate economic significance of industrial policy lies in whether it increases the productive capacity of the European economy.

Finally, relatively little literature provides a comprehensive KPI architecture capable of tracing the entire causal chain from EU budgetary inputs through

investment leverage and industrial outputs to productivity, competitiveness, resilience and GDP effects. This represents an important opportunity for further research.

The literature therefore demonstrates that EU industrial policy has evolved from a predominantly horizontal, market-enabling approach towards a more strategic and multidimensional model. The traditional foundations of European economic governance—market integration, competition and openness—remain central, but they are increasingly complemented by targeted intervention aimed at technological capability, strategic capacity, supply-chain resilience, energy security and economic sovereignty.

The transformation has been driven by changes in the international economic environment as much as by changes in European policy thinking. Globalisation has created both efficiency and vulnerability; technological competition has made industrial capabilities strategically important; and geopolitical conflict has transformed economic dependencies into questions of security.

The emerging European model should therefore not be interpreted as a rejection of markets. Rather, it represents an attempt to shape the productive capabilities and strategic conditions upon which Europe's long-term prosperity depends. The central research question is consequently no longer whether the EU should pursue industrial policy, but how effectively European resources can be converted into additional investment, productive capacity, competitiveness and resilience, and ultimately into higher potential GDP and greater strategic autonomy.

This suggests a shift in the research agenda from describing industrial-policy initiatives towards measuring their causal effectiveness. Investment leverage, productivity, competitiveness, strategic resilience and GDP impact can consequently be understood as interconnected dimensions through which the fragmented literature on EU industrial policy can be integrated into a single analytical framework.

Critical Synthesis of the Literature

The literature reveals both continuity and transformation in EU industrial policy. The EU has not abandoned its traditional regulatory model: the Single Market, competition policy and market mechanisms remain central. However, these have increasingly been complemented by strategic subsidies, industrial alliances, critical-raw-materials policies, clean-technology support, economic-security instruments and supply-chain diversification.

Contemporary EU industrial policy is therefore best understood as a **hybrid and layered model**. Rather than replacing market-based governance, the EU has added strategic and interventionist elements to it. Competitiveness is increasingly linked to resilience, technological capacity, decarbonisation and economic security. Similarly, external economic relations are becoming increasingly relevant to the ability of European industry to secure resources, technologies, energy and infrastructure.

Major Gaps in the Literature

Several gaps emerge from the literature. First, the external dimension of EU industrial policy remains underdeveloped. Research has focused largely on European firms, markets and institutions, while giving less attention to the external relationships required to sustain European industrial capacity.

Second, industrial policy and foreign economic policy are often treated separately, despite the growing geopolitical significance of resources, technologies and supply chains. Third, insufficient attention has been given to connectivity as an industrial-policy instrument. Transport, logistics, energy and digital infrastructure are essential for securing critical inputs and therefore form part of the wider industrial ecosystem.

Theoretical, Empirical and Methodological Gaps

The principal theoretical gap concerns the limited integration of industrial-policy theory with strategic autonomy, economic security and geoeconomics. Existing approaches explain important parts of the transformation but do not fully capture how domestic industrial capabilities depend upon external economic relationships. This study addresses this gap through the concept of **strategic interdependence**, understood as the deliberate management and diversification of external dependencies in support of European industrial objectives.

The empirical gap concerns the limited evidence on the outcomes of recent EU instruments, including the Chips Act, Critical Raw Materials Act, Net-Zero Industry Act and State-aid reforms. More evidence is needed on whether these measures increase production capacity, investment, technological capability and resilience.

The methodological gap reflects the fragmented nature of existing research. Much of the literature relies on legal and policy analysis, while economic studies often examine trade or investment separately. A stronger approach connects **policy instruments, institutional processes, economic outcomes and geopolitical developments** through comparative and mixed-method analysis.

Synthesis of the Gaps

Overall, the literature provides extensive knowledge of EU industrial policy but remains fragmented across industrial economics, strategic autonomy, economic security, trade and foreign policy. The central gap is therefore the absence of an integrated framework explaining how **internal industrial transformation increasingly depends upon external economic relationships**.

This study addresses that gap by analysing EU industrial policy through the relationship between **strategic objectives, legal instruments, institutional coordination, strategic sectors and external economic interdependence**. The central proposition is that European industrial resilience does not require the elimination of international dependence. Instead, it increasingly depends on the **strategic management, diversification and institutionalisation of interdependence**.

Scholarly Contribution

The existing scholarship provides an important foundation for understanding the return of industrial policy in Europe, but it remains fragmented across industrial policy, strategic autonomy, economic security and geoeconomics. Research has established the renewed importance of state intervention, strategic sectors and structural transformation (Aiginger & Rodrik, 2020; Juhász et al., 2023), while scholarship on EU strategic autonomy has examined competitiveness, geopolitical rivalry and external dependence (Steinbach, 2023; Mariotti, 2025). However, these perspectives have not been sufficiently brought together into a common **analytical framework** capable of explaining how the transformation of EU industrial policy increasingly extends into external economic relations.

The study therefore develops an analytical framework that connects **industrial transformation with strategic interdependence**. Rather than treating industrial policy, economic security and external relations as separate policy domains, the framework examines how they interact. It conceptualises strategic interdependence as the EU's capacity to manage and diversify external economic relationships in order to secure the resources, technologies, energy, infrastructure and markets necessary for industrial transformation. This builds on Farrell and Newman's (2019) concept of weaponised interdependence while applying it to the changing architecture of EU industrial policy.

The framework is structured around a sequence of interconnected analytical dimensions: **industrial challenge, strategic objective, legal framework, policy instrument, institutional coordination, external relationship and industrial outcome**. This enables the study to examine not simply what policies the EU adopts, but **why they are adopted, through which instruments, by which institutions, in relation to which strategic dependencies, and with what intended or observable consequences**.

The framework also provides a basis for integrating the sectoral analysis. Strategic sectors such as critical raw materials, semiconductors, clean technologies and energy are examined not as isolated policy areas but as cases through which the broader transformation of EU industrial strategy can be observed. The analysis therefore asks how particular industrial vulnerabilities generate strategic objectives, how these objectives are translated into legal and policy instruments, and how their implementation increasingly requires relationships with actors and markets beyond the EU.

This approach addresses the research gap identified by recent scholarship concerning the fragmented character of EU industrial-policy research (Di Carlo, 2026) and the insufficient integration of industrial policy with economic security (Steinberg, 2024). The contribution is therefore primarily **analytical**: the study provides a framework for understanding the EU's industrial transformation as a process linking domestic productive capacity with external economic interdependence.

The framework is complemented by a **SWOT analysis and comparative assessment of major powers' industrial policies**. The SWOT analysis evaluates the internal strengths and weaknesses of the EU's industrial-policy model alongside the external opportunities and threats emerging from the changing global economic and geopolitical environment. The comparative dimension then situates the EU within the wider global industrial-policy landscape, allowing its industrial capacity, strategic positioning and policy leverage to be assessed in relation to other major powers.

Together, these elements allow the study to move beyond a descriptive assessment of individual EU initiatives. The purpose is to identify the **structure, mechanisms and strategic logic** of the emerging European industrial-policy model. The analysis ultimately examines whether the EU is developing a distinctive form of industrial governance in which competitiveness, resilience, economic security and international economic relationships are increasingly integrated.

The central analytical proposition is therefore that the

EU's industrial-policy transformation should not be understood simply as a return to protectionism or traditional state-led industrial policy. Rather, it represents the development of a **strategic and externally oriented model of industrial governance**, in which domestic capabilities and external relationships are mutually reinforcing. European industrial resilience increasingly depends not on eliminating international dependence, but on **managing, diversifying and strategically organising interdependence**.

To make the proposition intelligible, we develop an **analytical framework** that connects the internal and external dimensions of EU industrial policy. The framework allows us to trace how industrial challenges are translated into strategic objectives, legal and policy instruments, institutional coordination and, ultimately, external economic relationships and industrial outcomes. This provides a structured basis for examining how the EU is responding to strategic dependencies and whether its emerging industrial policy represents a shift towards a more externally oriented model of strategic economic governance.

Methodology

This study employs a mixed-methods approach to analyse the transformation of EU industrial policy. The research combines qualitative analysis with quantitative assessment in order to examine both the evolution of policy objectives and their relationship to industrial outcomes.

The qualitative component is based on a systematic review of EU policy documents, including treaties, regulations, directives, Commission communications, industrial strategies, Council conclusions and official reports. Particular attention is given to documents relating to competitiveness, industrial strategy, economic security, strategic dependencies, critical raw materials, semiconductors, the green transition and technological development. The analysis examines how industrial-policy objectives, legal competences and policy instruments have evolved over time and how they collectively contribute to the emergence of a more strategic approach to industrial governance.

The document analysis is complemented by a review of the academic literature on industrial policy, economic security, strategic autonomy, innovation systems, global value chains and industrial governance. This literature provides the theoretical foundation for interpreting policy developments and situating them within broader debates concerning the changing role of the state in economic development and industrial transformation.

The quantitative component evaluates industrial performance through a comparative assessment of major industrial economies, including the European Union, the United States, China, Japan, India, Brazil and Russia. The analysis draws upon indicators commonly used to assess industrial competitiveness and productive capacity, including manufacturing value added, industrial output, research and development expenditure, productivity, innovation performance, high-technology production, trade integration and participation in global value chains.

Additional indicators relating to economic security and resilience are incorporated where available, including measures of supply-chain concentration, strategic dependencies, critical-resource exposure and technological capabilities. These indicators are used to assess the relative industrial position of the EU and to examine how evolving policy objectives correspond with broader trends in industrial performance and competitiveness.

Rather than treating legislation and policy initiatives as evidence of success in themselves, the analysis distinguishes between policy outputs and industrial outcomes. Outputs include legislation, funding programmes, strategic initiatives and regulatory measures, while outcomes are assessed through changes in investment, productive capacity, innovation, competitiveness, resilience and long-term industrial performance.

I employ a case study because it allows me to examine a Eu industrial policy at the nexus of *foro interno, foro externo* by means of the four pivots -Brazil, Chile. Nigeria and Kazakhstan – and then more broadly to Central Asia in depth and within its real-world context. Rather than looking only at broad regional trends, a case study helps me understand how and why a particular phenomenon occurs, including the roles of political, economic, social, and historical factors. It also allows me to combine different types of evidence, such as documents, and statistical data, to develop a more detailed and nuanced understanding of the issue.

We deliver on the organigramme, articulates the KPI framework and consider how to move to and to which extent on one industrial budget line potentially replacing the dense institutional order, aka as the drawer-cum-cigar box system.

Comparative methods are employed to study different industrial policy regimes amongst major global powers, including the **United States, China, the European Union,**

Russia, India, Japan, and Brazil. This approach allows researchers to compare how these actors use government intervention to strengthen domestic industries and enhance their economic competitiveness. It examines differences in areas such as subsidies, trade policy, investment incentives, technological development, energy policy, and support for strategic industries. Comparing these different cases helps identify how domestic institutions, economic structures, and geopolitical priorities shape industrial policy choices. Ultimately, comparative analysis provides for an evaluation of into how different industrial policy regimes influence the economic and strategic position of major powers in the global economy, what works and which great power performs in the better manner and the lessons learned.

The study applies the conceptual framework developed in this research to connect industrial vulnerabilities, strategic objectives, legal competences, policy instruments, institutional coordination, implementation mechanisms and industrial outcomes. Strategic sectors—including semiconductors, critical raw materials, clean technologies, advanced digital technologies and energy-intensive industries—serve as empirical cases through which these relationships could be examined.

By combining qualitative policy analysis with quantitative performance assessment, the study seeks to provide a comprehensive understanding of how EU industrial policy has evolved from a predominantly market-regulatory model towards a more strategic and interventionist framework centred on competitiveness, resilience, economic security and the management of interdependence.

This is an AI analysis and a desk job, largely compiled Sunday the 16.08.2026 during 10 hours of intensive work in front of my laptop, an Acer.

The inquiry is situated during the power transition in international relations amidst fears of massive layoffs due to fears of automation and in the context of the IGC2026 and onwards. We posit there is a need for a rethink of the EU's industrial policy and associated strategies initiated during UVL I+II in order to consolidate GDP growth and for the use of the EU's financial levers to promote the causes shared by all engaged in the economic modernisation of the European Economy and the development of a European capitalism with its own objectives and values.

Structure

The structure is determined by the practical purpose of the long essay. We proceed in the following manner:

Chapter 2

Legal Background: The Constitutional Foundations, Secondary Legislation and Institutional Coordination of EU Industrial Policy

The starting point for determining the constitutional basis of EU industrial policy is Article 173 TFEU. Unlike policy areas in which the Treaties confer extensive legislative powers upon the Union, Article 173 establishes a more limited and carefully circumscribed role for EU action in relation to industry. Article 173(1) provides that the Union and the Member States are to "ensure that the conditions necessary for the competitiveness of the Union's industry exist." The provision further requires their action to be directed towards facilitating "the adjustment of industry to structural changes", encouraging "an environment favourable to initiative and to the development of undertakings throughout the Union", particularly small and medium-sized enterprises, and fostering an environment favourable to cooperation between undertakings. It also identifies the need to "foster better exploitation of the industrial potential of policies of innovation, research and technological development."

Chapter 3

From the Regulatory State to Transformational Industrial Policy

The history of European integration has often been interpreted through the concept of the regulatory state, in which the European Union primarily shaped markets through rules, standards and competition policy. Recent developments, however, suggest a significant transformation in the role of the Union. Industrial strategy, public investment, economic security and technological development increasingly occupy a central place within EU policymaking.

This chapter explores the intellectual and political transition from the regulatory state towards a more transformational model of industrial governance. It examines the factors that have contributed to this shift, including global competition, technological change, climate objectives, geopolitical tensions and strategic dependencies.

Understanding this transformation requires a framework capable of connecting legal structures, policy objectives and industrial outcomes. The next chapter therefore develops the analytical framework that guides the remainder of the study.

Chapter 4

Analytical Framework

To analyse the transformation of EU industrial policy systematically, a coherent analytical framework is required. Industrial policy is not simply a collection of regulations, funding programmes or sectoral initiatives. It is a process through which vulnerabilities generate strategic objectives, objectives are translated into policy instruments, and those instruments are implemented through complex systems of governance.

This chapter develops the conceptual framework used throughout the study. It identifies the relationships between industrial vulnerabilities, strategic objectives, legal competences, policy instruments, institutional coordination, implementation mechanisms and industrial outcomes. The framework provides the structure through which the evolution of EU industrial policy can be examined across different sectors and policy domains.

Having established the analytical framework, the study proceeds to examine the historical development of EU industrial policy itself.

Chapter 5

The Evolution of EU Industrial Policy

EU industrial policy has undergone a profound transformation over the course of European integration. What began as a largely market-oriented approach focused on removing barriers to trade and promoting competition has evolved into a broader strategy concerned with competitiveness, innovation, decarbonisation, resilience and economic security.

This chapter traces the historical evolution of EU industrial policy, identifying the major phases through which it has developed. It examines how changing economic conditions, technological developments and geopolitical challenges have progressively expanded the scope of industrial intervention.

The historical analysis provides the foundation for understanding the growing importance of economic security as a defining objective of contemporary industrial policy.

Chapter 6

From Competitiveness to Economic Security

Competitiveness has long served as the central objective of EU industrial policy. In recent years, however, economic security has emerged as an equally important concern. The experience of supply-chain disruptions, energy crises, technological rivalries and geopolitical tensions has highlighted the vulnerabilities associated with excessive dependence on external actors.

This chapter examines how economic security has transformed the objectives and instruments of EU industrial policy. It explores the emergence of resilience, strategic autonomy and vulnerability reduction as key policy priorities and assesses their implications for industrial governance.

The rise of economic security has also expanded the scope of industrial policy beyond traditional market concerns, leading to the development of new internal policy domains.

Chapter 7

Domains of Internal EU Industrial Policy: Beyond Market Integration

Industrial policy is no longer confined to measures designed to improve the functioning of the internal market. It increasingly encompasses a broad range of policy domains, including innovation, energy, climate, digital transformation, strategic technologies and industrial resilience.

This chapter examines the principal internal dimensions of contemporary EU industrial policy and analyses how they contribute to broader strategic objectives. It demonstrates that industrial policy has become an integrating framework connecting multiple areas of EU governance.

The growing importance of external dependencies, however, means that industrial strategy can no longer be understood solely through its internal dimensions. This leads to the externalisation of industrial policy.

Chapter 8

The Externalisation of EU Industrial Policy

The competitiveness and resilience of European industry increasingly depend upon resources, technologies, energy supplies, infrastructure and markets located beyond the Union's borders. As a result, industrial policy is becoming progressively externalised.

This chapter examines how external economic relationships are being incorporated into the EU's

industrial strategy. It explores the role of trade policy, investment partnerships, connectivity initiatives, critical-raw-material agreements and economic-security measures in supporting European industrial objectives.

To illustrate these dynamics in practice, the next chapter examines four country cases that reveal different dimensions of the EU's emerging external industrial strategy.

Chapter 9

Case Study: The Four Pivots — Kazakhstan, Brazil, Nigeria and Chile

The externalisation of industrial policy becomes most visible when examined through concrete partnerships. Different countries contribute to European industrial objectives in different ways, reflecting variations in resources, geography, infrastructure, technological capabilities and market structures.

This chapter analyses Kazakhstan, Brazil, Nigeria and Chile as four strategic pivots within the EU's evolving external industrial strategy. Each case highlights a distinct dimension of industrial interdependence, including critical raw materials, energy, industrial development, connectivity and value-chain integration.

The findings also point towards the growing strategic significance of Central Asia within the broader geography of European industrial policy.

Chapter 10

Central Asia as an Emerging Industrial Space

Central Asia occupies an increasingly important position within the emerging architecture of European industrial strategy. The region combines significant resource endowments with growing relevance for transport, energy and connectivity networks linking Europe and Asia.

This chapter examines the strategic role of Central Asia and assesses its potential contribution to resilient industrial value chains. Particular attention is given to Kazakhstan and to the wider regional framework through which industrial cooperation may develop.

Having examined the external dimension, the study turns to the strategic sectors through which contemporary industrial policy is implemented.

Chapter 11

Strategic Sectors and Policy Areas

The transformation of EU industrial policy is most clearly expressed through its treatment of strategic sectors. Semiconductors, critical raw materials, clean technologies, advanced digital industries and energy-intensive sectors have become focal points for industrial intervention.

This chapter analyses these strategic sectors and demonstrates how industrial objectives increasingly intersect with technological, environmental and security considerations. Strategic sectors provide the empirical evidence through which broader changes in industrial governance can be observed.

The next chapter evaluates the strengths and weaknesses of the EU's industrial position through a systematic SWOT analysis.

Chapter 12

SWOT Analysis of the European Union's Industrial Profile

Assessing the future of European industrial policy requires a clear understanding of the Union's strengths, weaknesses, opportunities and threats. Such an assessment provides insight into both existing capabilities and future challenges.

This chapter applies a SWOT framework to evaluate the EU's industrial profile, examining productive capacity, technological capabilities, market integration, strategic vulnerabilities and geopolitical pressures.

The analysis is then placed in a broader international context through comparison with other major industrial powers.

Chapter 13

The Industrial Backbone of Our Livelihood in the Future

This chapter examines the productive foundations upon which European prosperity will depend. It asks which infrastructures, technologies, skills, energy systems, research capabilities and industrial ecosystems will determine Europe's capacity to generate income, employment and social welfare in the decades ahead. The focus is not simply on individual industries, but on the industrial backbone that enables the entire economy to become more productive.

The chapter therefore considers electricity grids and energy infrastructure, digital and AI infrastructure, skills and education, advanced manufacturing, clean technologies, healthcare and biotechnology, strategic supply chains, semiconductors, and defence-related technologies. It evaluates these sectors according to their investment return, contribution to GDP and productivity, social welfare, strategic resilience and utility per euro for European citizens.

The central argument is that Europe's future standard of living will depend increasingly on its ability to build and maintain these foundations. The question is not merely which industries will grow, but which capabilities will allow Europe to remain productive, prosperous and resilient.

Chapter 14

Tomorrow's Competitive Industries

This chapter turns from the foundations of the economy to the industries most likely to compete and grow within the next technological revolution. It asks where Europe can develop globally competitive capabilities and where it should concentrate its industrial, technological and financial resources.

Tomorrow's competitive industries are likely to include artificial intelligence and advanced computing, robotics, semiconductors, biotechnology, advanced materials, clean industrial technologies, energy systems, aerospace and defence, quantum technologies and digitally enabled manufacturing.

The chapter examines why some industries become globally competitive while others decline. It draws on the ideas of Schumpeter, Carlota Perez, Romer, Aghion, Mazzucato, Rodrik, Dosi, Freeman and Porter to examine technological revolutions, innovation, competition, state intervention, industrial ecosystems and productivity growth.

The central question is therefore not which companies should Europe protect, but which ecosystems should Europe build so that globally competitive companies can emerge. Europe's industrial strategy should combine market-making with selective market-shaping, using regulation, infrastructure, research, skills, finance, procurement and the Single Market to create the conditions in which tomorrow's industries can flourish.

Chapter 15

Industry 5.0

The EU's Industry 5.0 vision moves beyond industry 4.0 focus on automation, connectivity and effeciency by placing people, sustainability and resilience at the center of industrial production. It combines advanced technologies such as AI, robotics, digital twins and smart manufacturing with human creativity, skills and judgement.

Its objective is not simply to automate work, but to create human-centered, sustainable and resilient industries. In this sense, Industry 5.0 represents a shift from technology-driven production towards a more inclusive and socially responsible industrial paradigm.

Its aim is to act as overarching framework or principles and to provide certain plug-ins to the EU's Industry Policy and strategies.

Chapter 16

Comparison of Industrial Policies

Industrial policy is increasingly returning as a central feature of economic governance across the world. The European Union is not acting in isolation but within a global environment shaped by competing industrial strategies.

This chapter compares the EU's industrial model with those of the United States, China, Japan, India, Brazil and other major economies. The comparison highlights similarities, differences and distinctive characteristics of the European approach.

These findings provide the foundation for considering how EU industrial governance might be strengthened in the future.

Chapter 17

Co-thinking with stakeholders on EU Industrial Policy

This chapter examines how stakeholders can jointly shape the European Union's industrial policy. It highlights the importance of cooperation between EU institutions, businesses, workers, researchers, and civil society. The chapter presents **co-thinking** as a way to bring different perspectives into policymaking. It explores how stakeholder participation can improve the effectiveness and legitimacy of industrial policies. It also considers the

challenges of balancing diverse interests and priorities across Europe.
Overall, the chapter argues that collaborative policymaking is essential for a competitive, sustainable, and resilient EU industry.

Chapter 18

Plug-Ins in the Industrial Renewal of the EU's Industrial Policy

This chapter explores a simulated dialogue among European stakeholders about the unresolved challenges of EU industrial policy. It uses discussion and debate to represent different perspectives on Europe's industrial future. The chapter examines tensions between competitiveness, sustainability, strategic autonomy, and social interests. It shows how stakeholders may disagree on the priorities and instruments of EU industrial policy. The simulation demonstrates the value of dialogue in understanding complex policy choices and finding common ground. Overall, the chapter highlights co-thinking and stakeholder dialogue as tools for addressing unresolved questions in EU industrial policy.

Chapter 19

Strengthening Governance of EU Industrial Policy and Moving Towards a 5% EU Budget Allocation

If industrial policy is to achieve its objectives, effective governance and adequate financing are essential. The increasing scope of industrial intervention raises important questions concerning coordination, institutional capacity and resource allocation.

This chapter examines proposals for strengthening EU industrial governance and evaluates the case for allocating approximately 5% of the EU budget to industrial policy and competitiveness objectives. It also considers mechanisms for improving coordination between EU institutions and Member States.

The effectiveness of such investments ultimately depends on their ability to generate VIsionmeasurable outcomes, which is the focus of the following chapter.

Chapter 20

From Output to Outcome and Impact of EU–Member-State Industrial Policy

Industrial policy should not be assessed solely by the quantity of legislation adopted or resources allocated. Its success depends upon whether policy interventions generate meaningful industrial outcomes and long-term economic impacts.

This chapter develops an outcome-oriented approach to industrial-policy evaluation. It distinguishes between inputs, outputs, outcomes and impacts and examines how public interventions contribute to productivity, competitiveness, resilience and economic growth.

To operationalise this approach, the next chapter develops an integrated KPI framework.

Chapter 21

EU–Member-State Industrial Policy: An Integrated KPI Framework

A strategic industrial policy requires a systematic method of measuring performance. Without clear indicators, it becomes difficult to evaluate effectiveness, compare interventions or allocate resources efficiently.

This chapter develops an integrated KPI framework linking EU and Member-State industrial policies to measurable outcomes. The framework connects investment, productivity, competitiveness, innovation, resilience and long-term economic performance within a coherent system of evaluation.

Having completed the empirical and analytical examination, the study proceeds to its conclusions, where the findings are brought together and their broader implications assessed.

Chapter 22

A Single Budget Line under DG Industry

Europe could establish a single strategic industrial budget line under DG Industry connecting people, organisations and technology. The purpose would be to overcome the fragmentation between R&D, skills, industrial investment, scale-up and strategic technologies. Tomorrow's industries cannot be built by funding these elements separately: AI requires researchers, computing infrastructure, firms, capital and skilled workers; semiconductors require research, equipment, factories, suppliers and specialised skills; clean technologies require technology, infrastructure, finance and markets. The budget should therefore finance the whole industrial transformation chain, from research and skills to demonstration, production, scale-up and European market access. It could provide the financial backbone for the €130 billion strategy, prioritising energy

infrastructure, AI, skills, clean technologies, frontier R&D, biotechnology, strategic supply chains, semiconductors and defence R&D.

The counterpoint is that a powerful DG Industry budget could become a vehicle for corporate lobbying, protectionism and picking winners. The solution is not to abandon the single budget line but to impose strict conditions: competitive allocation, measurable European added value, co-investment from private capital, time limits and withdrawal of support when objectives are not achieved. DG Industry should shape ecosystems rather than protect companies, using most resources for infrastructure, R&D, skills and market creation, while keeping direct corporate subsidies limited. The principle should be simple: one strategic budget line, but no blank cheque for industry. Its success should ultimately be measured by the additional productivity, investment, high-quality employment, technological capacity, resilience and utility per euro for European citizens that it creates.

Chapter 23

Leading change in complexity

Leading change in complexity requires more than clear objectives and decisive action. It demands the ability to navigate uncertainty, competing interests, and rapidly shifting circumstances. Leaders must understand that complex systems rarely respond to simple solutions or linear plans. They need to anticipate emerging risks while remaining adaptable when assumptions prove wrong. This requires strategic foresight, institutional agility, and a willingness to challenge established thinking. Effective leaders create direction without pretending to have complete control over outcomes. They also build trust by engaging stakeholders and making difficult trade-offs transparent. Ultimately, leading change in complexity means turning uncertainty into a source of learning, resilience, and strategic advantage.

Chapter 24

Industrial Competition Between Tomorrow's Great Powers

Industrial competition is emerging as one of the principal dimensions of twenty-first-century great-power rivalry. Economic strength, technological innovation, and manufacturing capacity are increasingly viewed as foundations of national power alongside traditional military capabilities. Advanced sectors such as semiconductors, artificial intelligence, telecommunications, clean energy, and critical minerals have become central to strategic competition among major states. Governments are responding by adopting industrial policies designed to secure technological leadership and reduce dependence on foreign suppliers. At the same time, the growing overlap between economic and security concerns has blurred the distinction between commercial competition and geopolitical confrontation. Measures such as export controls, investment screening, and industrial subsidies are now frequently employed as instruments of statecraft. This trend has created new opportunities for innovation and growth but has also introduced risks of escalation and economic fragmentation. Understanding how industrial competition can be managed without undermining international stability is therefore a critical challenge for tomorrow's great powers. And it is a diplomatic challenge with variable geometry concerning actor and participants in different geographic settings indirect conflict will pan out between tomorrow's great powers.

Chapter 25

Strategic Industry Map: EU, United States, China, India and Russia

EU: diverse, advanced and interconnected. United States: innovative and technology-driven. China: dominant in global manufacturing. India: rapidly developing industrial power. Russia: rich in energy and raw materials. Together, they shape global industry.

Chapter 26

Excursion to Italy's and German industrial landscape

Germany is a major industrial power, especially in automobiles, machinery, chemicals and engineering. Italy has important industrial regions, particularly in the north around Milan, Turin and Bologna. Germany's industry is supported by strong infrastructure, skilled labour and major export markets. Northern Italy is characterised by small and medium-sized manufacturing firms and specialised industrial districts. Both countries benefit from strategic transport networks, including roads, railways, rivers and ports. The excursion shows how European industry is changing through technology, innovation, sustainability and international competition.

Chapter 27

The EU in the Global Industrial Pentarchy: Competitiveness, Strategic Dependencies and the Race for Industrial Power

The EU is part of a global industrial pentarchy alongside the United States, China, India and Japan, but its position is

increasingly challenged by differences in scale, investment capacity, technology and access to strategic resources. Europe therefore faces a fundamental question: how can it remain open to global trade while reducing excessive dependencies in areas such as energy, semiconductors, critical raw materials, digital technologies and industrial supply chains? Its objective should not be complete self-sufficiency, but open strategic autonomy, combining European industrial capabilities with carefully managed international partnerships. This requires a stronger European industrial policy that mobilises public and private investment, encourages cooperation between European firms, and uses the scale of the Single Market to support innovation and strategic sectors. At the same time, Europe can leverage its geographical position by connecting its industrial base with Asian manufacturing capabilities, Middle Eastern capital and Mediterranean energy and logistics networks, creating international value chains that strengthen rather than undermine European capabilities. The broader challenge is therefore to develop a distinctive form of European capitalism that remains globally connected and competitive while pursuing European objectives of technological leadership, economic resilience, social cohesion and strategic autonomy. A more systematic data infrastructure on the structural power of Great powers, however, has been lacking, hence our understanding how to intervene and certainty about how to cooperate and contribute to the development of European capitalism.

Chapter 28

Industrial Society and Urban Planning

Industrialization transformed European society by changing where people lived, how they worked, and how cities were organized. As factories expanded, millions of people moved from rural areas to towns and cities in search of work. This rapid urbanization created new opportunities but also produced overcrowding, pollution, poor housing, and difficult working conditions.

Governments gradually responded through urban planning, building roads, sewers, public transport, parks, and healthier housing. Industrial cities therefore became laboratories for modern social and economic organization.

At the same time, industry created new social classes. The industrial bourgeoisie gained economic power, while the working class grew rapidly around factories and mines. These changes encouraged trade unions, workers' movements, and demands for better wages and political rights.

Industrial society thus reshaped not only the economy but also European cities, social relations, politics, and everyday life.

Chapter 29

Building Factories, Infrastructure, Skills, and Supply Chains Faster in Europe and Its Near Abroad

Europe needs to build factories and infrastructure faster to remain competitive. This requires quicker permits, better financing, and stronger coordination across countries. Investment in energy, transport, digital networks, and industrial capacity must accelerate. Europe also needs more skilled workers and stronger technical education and training. Closer supply-chain partnerships with neighbouring countries can improve resilience and reduce risks. Together, these measures can create a faster, stronger, and more self-reliant European economy.

Chapter 30

How could the constitutional provisions on industry policy evolve?

Constitutional provisions on industry policy could evolve to give governments greater flexibility to respond to technological, environmental, and geopolitical change. Rather than prescribing detailed industrial measures, the constitution could establish broad principles for competitiveness, innovation, resilience, and sustainable development. It could clarify the respective roles of national and regional authorities in designing and implementing industrial policy. The framework could also recognise strategic sectors and critical supply chains as matters of national economic security. At the same time, constitutional safeguards should prevent industrial policy from becoming a vehicle for arbitrary state intervention or protectionism. Greater emphasis could be placed on long-term investment in skills, research, infrastructure, and productive capacity. The provisions could also require greater transparency and accountability when public resources are used to support strategic industries. Ultimately, an evolving constitutional framework should provide enough stability to guide long-term industrial strategy while remaining flexible enough to respond to profound economic and technological change. The chapter provides a consolidated review of the constitutional provisions, legislative measures, strategic initiatives and institutional developments examined throughout the study. It serves as a reference point for the evolution of EU industrial policy and supports the empirical analysis presented in the main text and proposes updated functional provisions for the EU's New Industrial policy.

Chapter 31

Renvoi

The Renvoi addresses the industrial power of the European Union: its capacity to shape markets, mobilise investment, develop strategic technologies, influence global standards and build the industrial capabilities required for tomorrow's economy. It examines not only what the EU can legally do, but also where its powers, norms and institutional authority allow it to intervene, and where responsibility remains primarily with Member States or private actors. The central question is therefore whether the EU can transform its regulatory and market power into productive industrial power, particularly in AI, energy, clean technologies, biotechnology, semiconductors, advanced manufacturing and defence R&D.

Conclusions

The conclusion synthesises the findings of the study and returns to the research questions posed at the outset. It evaluates the extent to which EU industrial policy has evolved from market regulation towards strategic intervention, how economic security has reshaped industrial objectives, and how external partnerships have become integral to industrial governance. The conclusion also considers the broader implications of managed strategic interdependence and External Strategic Industrial Policy for the future of Europe as an industrial power.

Appendix

The appendix contains a Q & A session on understanding the main issues broached in the exposé on the EU's Industrial policy and the struggles to make it work in the contemporary competitive markets for industrial goods, an industrial competition that forms a very important part to begin with why External Relations leads to great power competition and potentially war.

2.Legal Background: The Constitutional Foundations, Secondary Legislation and Institutional Coordination of EU Industrial Policy

Powers

The wording of Article 173 is constitutionally significant. The provision does not establish an autonomous and comprehensive power for the Union to determine the industrial structure of the European economy. Rather, it conceives industrial policy as an area in which Union action is principally intended to support, coordinate and supplement the measures undertaken by the Member States. This is made explicit in Article 173(2), which provides that the European Parliament and the Council, acting in accordance with the ordinary legislative procedure and after consulting the Economic and Social Committee and the Committee of the Regions, may adopt "specific measures in support of the actions taken in the Member States" to achieve the objectives set out in paragraph 1. Crucially, however, the same provision expressly excludes "any harmonisation of the laws and regulations of the Member States" adopted pursuant to Article 173.

Article 173(3) reinforces this allocation of powers by providing that the Union is to contribute to the achievement of the objectives of the provision through "the policies and activities pursued under other provisions of the Treaties." This formulation is particularly important for understanding the constitutional architecture of EU industrial policy. Industrial policy is not confined to the measures adopted directly under Article 173. Rather, industrial objectives may be pursued through the exercise of other Treaty competences, including those relating to the internal market, competition, State aid, research and technological development, energy, trade and environmental protection. Article 173 thus operates both as a specific Treaty basis for industrial action and as a constitutional gateway through which industrial considerations are integrated into other areas of Union policy.

The structure of Article 173 must consequently be read in light of the principle of conferral. Under Article 5(2) TEU, the Union is to act only within the limits of the competences conferred upon it by the Member States in the Treaties. Article 173 cannot therefore be interpreted as conferring a general power upon the Union to pursue whatever industrial objectives it considers desirable. The scope of Union action remains dependent upon the particular Treaty legal basis relied upon and upon the conditions attached to that competence. The prohibition on harmonisation contained in Article 173(2) is especially important in this respect: it distinguishes industrial policy from areas in which the Union possesses broader powers to approximate or harmonise national legislation.

At the same time, the relatively limited character of Article 173 does not render it constitutionally insignificant. Its importance lies partly in the way in which it frames the relationship between Union and national industrial policy. The provision assigns the Union a role in establishing conditions conducive to industrial competitiveness while preserving substantial regulatory and policy space for the Member States. Industrial policy therefore emerges from Article 173 as a form of shared governance rather than as a field of exclusive Union control. The Union may support

and coordinate national action, establish frameworks facilitating industrial development, and pursue industrial objectives through other Treaty competences, but it does not, by virtue of Article 173 alone, acquire a general competence to direct the industrial economies of the Member States.

This allocation of power is central to understanding the subsequent development of EU industrial policy. The constitutional evolution of industrial policy has not principally occurred through an expansion of Article 173 into a general industrial competence. Rather, it has resulted from the increasingly strategic use of Article 173 in conjunction with other Treaty bases and regulatory instruments. The contemporary scope of EU industrial policy must therefore be understood as the product of a composite legal architecture in which the Union's capacity to intervene derives from multiple sources of competence. The significance of Article 173 lies precisely in this architecture: it identifies industrial competitiveness as a legitimate Union objective while simultaneously defining the institutional and legal limits within which that objective may be pursued.

EU industrial policy is a shared competence. The EU can support, coordinate and complement Member State industrial policies, but it does not have unlimited authority to replace national industrial policy. It is a pragmatic policy doman the EU Industrial Policy that empowers the EU and member states to take actions in comity.

The European Commission has the strongest agenda-setting and regulatory role. It proposes legislation, enforces EU competition and state-aid rules, manages many EU funding programmes, and develops industrial strategies. The European Parliament participates in adopting legislation and the EU budget and provides political oversight of the Commission. The Council of the EU, representing national governments, is crucial because industrial policy remains closely connected to national economic interests. The European Council sets broad political priorities, particularly concerning competitiveness, economic security, energy and technological sovereignty. The European Central Bank does not have a conventional industrial-policy mandate, but its monetary policy influences investment, financing conditions and industrial competitiveness.

Therefore, EU power in industrial policy is often indirect and regulatory rather than simply command-and-control.

Norms

EU industrial policy is guided by several important norms. Traditionally, competition and the Single Market have been central. EU industrial policy has generally sought to prevent protectionism and distortions of competition between Member States. State-aid control has also limited the ability of national governments to subsidise companies in ways that distort competition, although these rules have become more flexible in areas such as the green and digital transitions.

At the same time, newer norms have become increasingly important. Sustainability and climate neutrality connect industrial policy to the European Green Deal. Strategic autonomy and economic security have gained importance as the EU seeks to reduce dangerous dependencies on external suppliers for critical technologies, energy and raw materials. Social and territorial cohesion, as well as technological leadership and innovation, also influence EU industrial-policy choices.

This indicates a movement from a predominantly market-liberal approach toward a more strategic and interventionist approach.

Meanings

The meaning of EU industrial policy has changed over time. In the earlier approach, industrial policy was often understood in terms of correcting market failures, promoting innovation and maintaining fair competition. The EU was therefore primarily seen as a market-maker and regulator.

More recently, industrial policy has increasingly come to mean actively shaping the structure and direction of the European economy. It is now associated with strategic autonomy, resilience, the green transition, technological sovereignty and geopolitical competitiveness.

Policies concerning semiconductors, batteries, hydrogen, critical raw materials and clean technologies are therefore not simply economic policies. They are increasingly understood as instruments of economic security and geopolitical power.

Overall, we could argue that EU industrial policy is shaped by a tension between the EU's market-making powers and its emerging market-shaping role. EU institutions operate within established norms of competition, the Single Market and sustainability, while the meaning of industrial policy has increasingly shifted toward strategic autonomy, resilience and economic security.

This is the world we work *in* and work *on* when we articulate an analytical framework as a mover and shaker of EU public policy.

2. 2. Constitutional foundations

The constitutional starting point of Eu's Industrial Policy is Article 3 of the Treaty on European Union, which establishes among the Union's objectives the development of a highly competitive social market economy and sustainable development. Although Article 3 does not itself constitute a detailed industrial-policy competence, it provides the broader constitutional environment within which industrial competitiveness, innovation, sustainability and economic development are pursued. The more specific Treaty foundation is found in Title XVII of the TFEU, entitled "Industry," and particularly Article 173. Article 173 requires the Union and Member States to ensure the conditions necessary for the competitiveness of Union industry. (EUR-Lex) The provision identifies several objectives, including accelerating industrial adjustment to structural change, creating an environment favourable to business initiative and enterprise development, encouraging cooperation between undertakings and improving the exploitation of the industrial potential of innovation, research and technological development. (EUR-Lex) Article 173 therefore establishes industrial competitiveness as a shared concern of the Union and Member States rather than reserving industrial policy exclusively to either level of government. This formulation is important because it makes European industrial policy inherently **multilevel**. The Union acts through its competences and instruments, while Member States retain extensive powers over taxation, industrial subsidies, company policy, infrastructure, education and other determinants of industrial competitiveness. Article 173(2) further requires Member States to consult one another in liaison with the Commission and, where necessary, coordinate their action. This provision is particularly significant for understanding the institutional character of EU industrial policy because coordination, rather than centralised command, is embedded in the constitutional design.

Article 173 also establishes a crucial limitation by requiring industrial action to operate within a system of open and competitive markets. This limitation reflects the historical constitutional settlement of European economic integration, in which industrial development was expected to occur primarily through market integration, competition and technological progress rather than through comprehensive European economic planning. The Treaty consequently does not empower the Union simply to select industries, protect firms or direct production according to political preference. Article 173 also contains limitations concerning harmonisation and does not constitute a general basis for replacing Member State industrial policies with a central EU industrial authority. The result is a constitutional tension between **industrial coordination and market liberalisation**. European industrial policy must promote competitiveness while respecting the principles of the internal market and competition law. This tension has remained one of the defining characteristics of EU industrial policy. It also explains why the Union has historically relied upon horizontal measures, such as research, infrastructure, skills and market integration, rather than extensive sector-specific intervention.

It says in the Treaties, the objectives of the Eu's Industry policy are:

-Speed up adaptation: Help businesses adjust quickly to changing market structures.

-Encourage enterprise: Foster an environment favorable to business initiative and growth across the Union, with a focus on small and medium-sized firms.

-Promote cooperation: Support networks and cooperative projects between industrial enterprises.

-Leverage innovation: Better connect research, technology, and innovation potential to industrial strength

The supranational institutions can undertake this through support, coordination and *supplement d'avenir*-measures, though increasingly resilience and green transition is taken into consideration. We must presume DG Industry presides over the inter-service task force overseeing the daily execution of policy between the no less than seven DG's in charge of industry related policies, ie. industry policy sometimes struggles to be more than the sum of the member states' interests. *Queerdenken* is out, integrated and coherent multi-level approaches are in.

The internal market as an industrial-policy foundation

The second major constitutional pillar is the internal market. Articles 26 and 114 TFEU provide important foundations for harmonising conditions across the European economy and removing regulatory barriers that fragment production and trade. Article 114 has become particularly important because many contemporary industrial measures are formally justified as measures necessary for improving the functioning of the internal market rather than as purely industrial interventions. This legal technique has enabled the Union to regulate strategic sectors while remaining within the constitutional structure of the Treaties. The internal-market competence is therefore one of the principal mechanisms through which the EU has expanded its practical industrial-policy capacity. The relationship between Articles 114 and 173 is

particularly important because it demonstrates that European industrial policy is not confined to the Treaty chapter explicitly entitled "Industry." Instead, industrial objectives can be pursued through legislation addressing market fragmentation, technological standards, supply chains, environmental requirements and strategic dependencies.

This is increasingly visible in recent legislation. The Critical Raw Materials Act, for example, is based principally on Article 114 TFEU and establishes a framework intended to secure the Union's access to critical raw materials and reduce supply risks that could distort competition and fragment the internal market.The legal structure illustrates the transformation of industrial policy from a narrow concern with industrial competitiveness into a broader concern with the resilience of the economic system supporting European production. Critical raw materials are therefore treated not merely as commodities but as inputs whose availability affects the functioning of the internal market. This development represents an important expansion of the practical meaning of industrial policy.

Competition law and industrial policy

Competition law constitutes the third pillar of the EU industrial-policy architecture. Articles 101 and 102 TFEU regulate anticompetitive agreements and abuses of dominant position, while Articles 107–109 govern State aid. These provisions historically placed significant constraints on national industrial policy because Member States could not simply subsidise domestic firms in ways that distorted competition and affected trade between Member States. Article 107(1), as a general rule, considers State aid granted through State resources that distorts or threatens to distort competition by favouring particular undertakings or production to be incompatible with the internal market, subject to Treaty exceptions and Commission assessment. The State-aid regime consequently transformed industrial policy from an essentially national instrument into an area subject to European supervision. The European Commission acquired a particularly important role because it is responsible for assessing the compatibility of State aid with the internal market. This gave the Commission substantial influence over the industrial strategies of Member States without granting it a comprehensive industrial-policy budget.

The relationship between competition and industrial policy has nevertheless changed significantly. During periods of crisis, the Commission has adopted temporary State-aid frameworks allowing Member States greater flexibility to support firms and strategic investments. The result has been a gradual movement from a model in which competition law primarily constrained industrial policy towards a model in which competition law increasingly **structures and coordinates industrial intervention**. This distinction is crucial. The EU has not abandoned competition policy; rather, it has adapted the competition framework to permit strategic industrial intervention under specified circumstances. The resulting system is therefore neither laissez-faire nor traditional industrial planning. It is a form of **regulated strategic intervention**.

Research, innovation and technological development

A fourth constitutional pillar is research and technological development. Articles 179–190 TFEU establish the basis for Union research policy and provide the legal foundation for major programmes that have contributed to European technological capabilities. Research policy has historically served as an indirect industrial-policy instrument because technological capacity is essential to industrial competitiveness. Horizon 2020 and Horizon Europe exemplify this approach by supporting research, technological development, innovation and cooperation between European actors. The importance of this competence has increased as industrial competition has become increasingly technology-intensive. Semiconductors, artificial intelligence, quantum computing, biotechnology, advanced materials and robotics have blurred the boundary between research policy and industrial policy. Contemporary European policy consequently treats technological leadership as a strategic industrial objective rather than simply as an academic or scientific objective.

This development has also altered the institutional relationship between the Commission, Member States, research institutions and industry. The EU increasingly seeks to connect research funding with industrial deployment, scale-up and commercialisation. The 2025 Competitiveness Compass explicitly identifies closing the innovation gap as one of its central objectives and proposes measures concerning artificial intelligence, advanced materials, quantum technologies, biotechnology, robotics and other strategic technologies. The emerging approach therefore seeks to bridge the traditional separation between research policy and industrial policy.

Environmental and climate law as industrial policy

Environmental policy constitutes a fifth major pillar. Articles 191–193 TFEU establish the constitutional basis for EU environmental action, while the European Green Deal has transformed climate policy into a major driver of industrial restructuring. The relationship between

environmental and industrial policy has become increasingly reciprocal. Environmental regulation creates incentives for industrial transformation, while industrial policy seeks to ensure that European firms can compete during that transformation. The Clean Industrial Deal explicitly seeks to make decarbonisation a driver of growth and industrial competitiveness. (European Commission) This represents a major conceptual change because climate policy is no longer treated solely as an external constraint on industrial activity. It is increasingly framed as an industrial-development opportunity.

The Net-Zero Industry Act illustrates this development by seeking to strengthen European manufacturing capacity in strategic clean technologies. More broadly, EU industrial policy increasingly uses regulation, investment, public procurement, financing and State-aid flexibility to create conditions for European clean-technology production. The result is an emerging model of **green industrial policy** in which environmental objectives and industrial objectives are institutionally intertwined. This also introduces new tensions because stringent environmental requirements may increase costs for European producers, while strategic industrial intervention seeks to prevent European firms from losing competitiveness. The legal framework therefore has to reconcile climate ambition with industrial competitiveness.

Energy law and industrial policy

Energy policy provides another essential component of the evolving industrial architecture. Article 194 TFEU gives the Union a basis for energy policy, including security of energy supply, functioning of the energy market, energy efficiency, development of renewable energy and interconnection of energy networks. The importance of this competence has increased dramatically because energy prices directly affect the competitiveness of energy-intensive European industries. The energy crisis following Russia's invasion of Ukraine demonstrated that industrial competitiveness could not be separated from energy security. The contemporary legal and policy framework therefore increasingly treats energy infrastructure, diversification, renewable energy and industrial decarbonisation as mutually connected.

The Clean Industrial Deal reflects this integration by placing particular emphasis on energy-intensive industries such as steel, metals and chemicals and on reducing energy costs while facilitating decarbonisation. The industrial-policy significance of energy law is therefore no longer limited to ensuring affordable energy. Energy infrastructure and supply relationships increasingly form part of the EU's wider strategic industrial architecture.

Infrastructure and connectivity

Articles 170–172 TFEU provide the constitutional basis for Trans-European Networks in transport, telecommunications and energy. These provisions are important because industrial competitiveness depends not only on firms and technologies but also on the infrastructure through which goods, energy, data and capital circulate. The EU's infrastructure policy therefore constitutes an indirect but increasingly strategic component of industrial policy. Transport corridors, ports, railways, energy interconnections and digital networks can determine the geography of industrial production.

This becomes particularly important when industrial policy is examined beyond the territorial boundaries of the Union. Critical raw materials may be extracted outside Europe, processed in several jurisdictions and transported through complex logistics networks before reaching European manufacturers. Industrial resilience therefore depends upon external infrastructure as well as internal infrastructure. The legal relationship between connectivity policy and industrial policy is consequently becoming increasingly significant for EU relations with Central Asia, Türkiye and the wider Eurasian region.

Trade and external economic relations

The Common Commercial Policy under Articles 206 and 207 TFEU constitutes another essential element of the industrial-policy framework. Trade policy affects the conditions under which European firms compete globally, the availability of imported inputs and the access of European products to foreign markets. As industrial policy has become more strategic, trade policy has increasingly been used to address economic dependencies, foreign subsidies, unfair competition and supply-chain vulnerabilities. This represents a significant shift from a traditional conception of trade policy as primarily concerned with market opening towards a broader conception in which trade policy also supports economic security.

The Foreign Subsidies Regulation is illustrative of this transformation because it addresses distortions created by financial contributions from non-EU governments to companies operating in the Union. The International Procurement Instrument similarly seeks to address reciprocity in access to foreign public-procurement markets. These instruments demonstrate that European industrial policy increasingly includes measures designed to shape the external competitive environment in which European firms operate.

The Critical Raw Materials Act

The Critical Raw Materials Act constitutes one of the clearest examples of the new industrial-policy architecture. Regulation (EU) 2024/1252 establishes a framework intended to secure resilient and sustainable supplies of critical raw materials while reducing vulnerabilities in European supply chains. (EUR-Lex) The Act identifies strategic raw materials including copper, cobalt, lithium, nickel, graphite, titanium, tungsten and rare earth elements, among others. (EUR-Lex) The legislation is particularly significant because it connects internal-market regulation with resource security, technological development, recycling, extraction, processing and external partnerships.

The Act therefore represents a major movement beyond conventional industrial policy. The Union is no longer concerned only with what European firms produce but also with whether they can reliably obtain the inputs necessary for production. This creates a direct legal connection between EU industrial policy and third-country resource relationships. For research concerning Kazakhstan and Central Asia, this is particularly important because the region's mineral resources can be analysed within the EU's emerging legal architecture for strategic supply diversification. The legislation's emphasis on diversification means that external partnerships can become components of European industrial resilience rather than merely matters of foreign economic cooperation.

The European Chips Act

The European Chips Act provides a second major example of strategic industrial legislation. Regulation (EU) 2023/1781 seeks to strengthen the European semiconductor ecosystem, increase resilience and reduce vulnerabilities in semiconductor supply chains. The Act demonstrates the increasing willingness of the Union to use targeted legislation to promote strategic production capacity. Its significance extends beyond semiconductor manufacturing because semiconductors are inputs into almost every major advanced industrial sector. The legislation therefore reflects the emergence of a concept of **strategic technology infrastructure**.

The Chips Act also demonstrates how the EU combines several instruments within a single industrial framework. Research, investment, skills, supply-chain monitoring, production capacity and coordination are treated as complementary elements. The legal architecture therefore moves away from the older separation between horizontal market policy and sectoral industrial policy. It instead creates a more integrated approach to strategic industrial ecosystems.

The Net-Zero Industry Act

The Net-Zero Industry Act represents the green counterpart to the Chips Act. It seeks to create favourable conditions for European manufacturing capacity in net-zero technologies. Its importance lies in its attempt to ensure that climate transition creates European industrial capabilities rather than merely increasing European demand for imported clean technologies. This responds to the strategic concern that Europe could achieve decarbonisation while becoming dependent upon foreign suppliers of the technologies required for decarbonisation.

The legislation consequently links industrial production, permitting, investment, skills, innovation and supply chains. It is an important expression of the emerging principle that **decarbonisation and industrial competitiveness should be pursued together**. This principle is now central to the Commission's industrial agenda. The 2025 Clean Industrial Deal explicitly seeks to turn decarbonisation into a source of industrial growth and competitiveness.

Foreign investment and economic security

The EU's Foreign Direct Investment Screening Regulation provides another component of the emerging architecture. Regulation (EU) 2019/452 created a framework for cooperation between Member States and the Commission concerning foreign investments that may affect security or public order. The legislation does not establish a fully centralised European investment-screening authority, but it creates institutional mechanisms through which Member States and EU institutions can exchange information and assess potential risks. This represents an important departure from the earlier assumption that foreign investment should primarily be viewed through the lens of capital mobility and market efficiency.

The Foreign Subsidies Regulation complements this framework by addressing distortions arising from foreign state support. Together, these instruments demonstrate the growing importance of **economic security** as a component of industrial policy. The European economy remains open to international investment and trade, but openness is increasingly conditioned by assessments of strategic risk.

The institutional architecture

The European Commission occupies the central position in the institutional organisation of EU industrial policy. Its role derives partly from its legislative initiative, partly from its responsibility for implementing EU programmes and partly from its authority over competition and State aid. Within the Commission, industrial policy is principally associated with the Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, although effective industrial policy necessarily involves multiple Directorates-General. Energy policy involves DG Energy, trade involves DG Trade, competition involves DG Competition, research involves DG Research and Innovation, climate policy involves DG Climate Action, and transport policy involves DG MOVE. This organisational fragmentation mirrors the cross-cutting character of industrial policy.

The Commission's role is therefore one of **coordination across policy domains** rather than simply administration of an industrial-policy programme. The Commission must reconcile competition policy with industrial support, climate objectives with competitiveness, trade openness with economic security, and national industrial strategies with European objectives. The 2025 Competitiveness Compass explicitly identifies better coordination between EU and national policies as one of its cross-cutting priorities.

The European Parliament constitutes the second major institutional actor. Under the ordinary legislative procedure, Parliament participates alongside the Council in adopting many of the regulations that form the contemporary industrial-policy framework. Parliament also exercises budgetary and political scrutiny over Commission initiatives. Its role has consequently become increasingly important as industrial policy has become more politically salient.

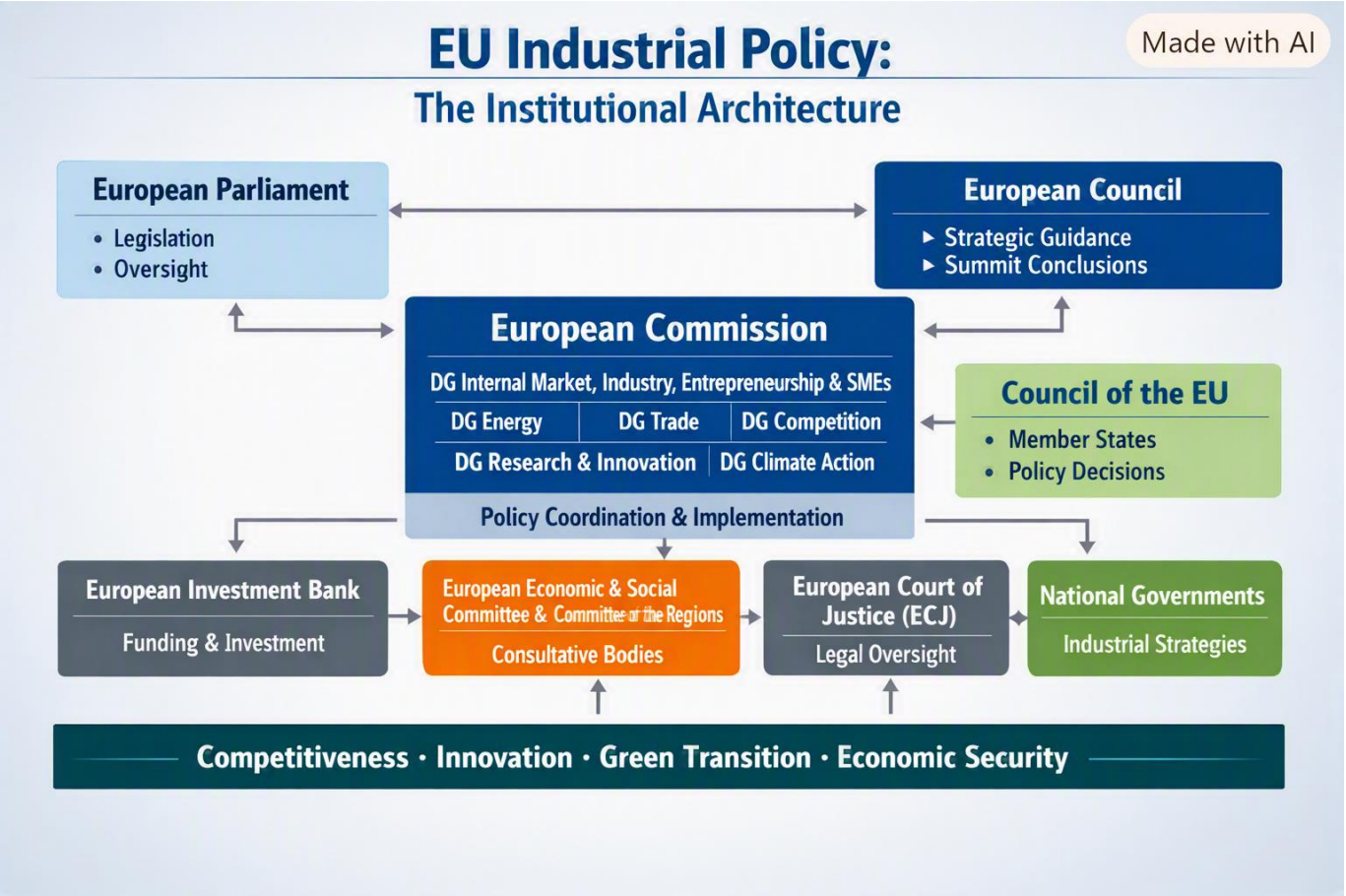
The Council of the European Union represents the Member States and provides the institutional mechanism through which national industrial interests are incorporated into European policy. Industrial policy is particularly dependent upon Council coordination because Member States retain extensive competence over their own industrial strategies. The Council therefore constitutes an essential arena for resolving conflicts between national and European industrial priorities.

The European Council has an increasingly important strategic role even though it does not normally legislate. Its conclusions can establish political priorities that subsequently guide the Commission, Council and Parliament. The movement toward strategic autonomy, economic security and European competitiveness illustrates the importance of this political steering function.

The European Investment Bank also plays an important role because industrial policy depends heavily upon investment. Although it is not an industrial-policy ministry, its financing capacity can support infrastructure, innovation, energy transition and strategic industrial projects. Its role is particularly important where EU industrial objectives require investment beyond what can be provided through the EU budget.

The European Economic and Social Committee and the Committee of the Regions provide consultative functions. Their involvement reflects the wider multilevel character of industrial policy, particularly because industrial transformation affects workers, regions, SMEs and local economies.

Figure



The organigramme of EU industrial policy reveals a finely balanced architecture of power and coordination. At its centre stands the **European Commission**, the engine of initiative and execution, orchestrating multiple Directorates-General whose interplay mirrors the cross-cutting nature of industry itself. The **DG Internal Market, Industry, Entrepreneurship and SMEs** anchors the system, yet its effectiveness depends on constant dialogue with DG Energy, Trade, Competition, Research, Climate Action and MOVE. This web of Directorates embodies the Commission's dual vocation: reconciling competition with support, climate with competitiveness, and openness with security. Surrounding this hub, the **European Parliament** acts as the democratic conscience, shaping legislation and scrutinising the Commission's ambitions. Opposite Parliament, the **Council of the European Union** channels national interests, ensuring that industrial policy remains a shared European enterprise rather than a centralised command. Above them, the **European Council** provides strategic direction — its conclusions often setting the tone for the Union's industrial priorities. Beneath the Commission, the **European Investment Bank** supplies the financial muscle that turns policy into tangible projects. The **European Economic and Social Committee** and the **Committee of the Regions** inject the voices of workers, SMEs and local communities into the policy bloodstream. The **European Court of Justice** safeguards legality, ensuring that industrial ambition never strays beyond the Treaty's constitutional boundaries. **National governments** complete the picture, translating European frameworks into domestic strategies and investments. Arrows between these bodies symbolise constant negotiation — a choreography of coordination rather than hierarchy. The architecture thus reflects a **multilevel governance model**, where authority is dispersed yet interdependent. It embodies the Union's evolution from horizontal market integration toward strategic industrial resilience. Each institution contributes a distinct rhythm: legislative, executive, judicial, consultative, financial, and political — together forming a living ecosystem, a **concert of institutions** harmonising competitiveness, sustainability and sovereignty across Europe.

The Union's inner machinery, so intricate and self-regarding, seems at last to feel the pull of distant shores — as if resilience itself were a kind of pilgrimage, urging Europe beyond its own bright threshold. What begins as governance becomes outreach, for no industry thrives alone; and in the quiet corridors of policy, one senses the tremor of far-off partnerships, like signals crossing a winter sky. Thus the internal order leans outward, discovering that its own pulse is answered by the world's, and that supply chains, like constellations, are steadied only by the bonds between them.

Yet this outward turning reveals another metamorphosis: the gentle shedding of the old horizontal garment, replaced by a more deliberate, strategic weave. The institutions, once content to tend the market's open fields, now gather themselves with a firmer purpose, as though uncertainty had taught them the art of vigilance. In their interplay, one hears the shift — from breadth to depth, from neutrality to intention — a quiet but resolute widening of what it means to guard Europe's industrial life.

And still, beneath this supranational canopy, the Member States stand like rooted trees, each with its own soil, its own seasons. Their presence renders the architecture not a diagram but a living grove, where coordination is less command than conversation. European ambition must bend to national contour, and national contour must rise to European horizon; between them lies the delicate path where sovereignty meets solidarity. In that meeting, the true challenge appears — to harmonise many wills into one forward motion, under skies that change without warning.

Coordination between EU and Member States

The central institutional problem is that industrial policy remains fundamentally **multilevel**. Member States retain significant powers over taxation, investment, skills, infrastructure and industrial support, while the Union possesses important powers over the internal market, competition, trade, research, environmental policy and strategic regulation. Article 173 explicitly requires Member States to coordinate their industrial actions where necessary. (EUR-Lex) This constitutional requirement provides an important foundation for European industrial coordination without transforming the EU into a centralised industrial state.

The result is a system of **coordinated national industrial policies operating within European legal constraints and increasingly within European strategic frameworks**. The relaxation of State-aid rules during crises has strengthened national capacity to support strategic sectors, but it has also created concerns about unequal fiscal capacities between Member States. Wealthier Member States can potentially provide greater industrial support than poorer Member States. European industrial coordination must therefore address not only competitiveness but also territorial cohesion.

The 2025 Competitiveness Compass recognises this problem by proposing a stronger coordination framework and by emphasising the need to reduce regulatory burdens, deepen the Single Market and coordinate EU and national policies. The emerging governance model therefore seeks to combine European strategic direction with national implementation.

From horizontal to strategic industrial policy

The historical evolution can now be understood as a movement through several stages. The first stage was dominated by market integration and competition. The second introduced competitiveness, innovation and research as indirect instruments of industrial policy. The third incorporated environmental transformation and the Green Deal. The fourth introduced resilience and economic security in response to external shocks. The current stage increasingly combines these objectives into a strategic industrial framework.

This transformation does not represent the abandonment of the original constitutional model. The Union remains committed to open and competitive markets. Instead, it represents an **expansion of what is considered necessary for those markets to function effectively under conditions of geopolitical and technological uncertainty**. Strategic supply chains, critical infrastructure, technological capabilities and secure energy supplies have consequently become part of the effective meaning of industrial competitiveness.

The legal architecture is thus evolving from a narrow conception of industry towards a broader conception of **industrial ecosystems**. The Critical Raw Materials Act illustrates this especially clearly because it regulates extraction, processing, recycling, diversification and strategic projects rather than simply supporting particular firms. The Chips Act similarly addresses an entire technological ecosystem. The Net-Zero Industry Act addresses manufacturing ecosystems associated with the green transition.

The emerging external dimension

The most important development for the purposes of this research is the externalisation of industrial policy. If European industry requires critical raw materials, energy, components and external markets, then industrial resilience cannot be achieved solely through internal EU measures. External partnerships therefore become increasingly relevant to the implementation of European industrial strategy.

The Commission's current competitiveness agenda explicitly recognises this dimension by emphasising trade partnerships and new Clean Trade and Investment Partnerships to secure raw materials, clean energy, sustainable transport fuels and clean technologies. This suggests that external economic relations are increasingly becoming instruments of industrial policy.

The legal framework consequently creates a potential bridge between European industrial strategy and Central Asia. Kazakhstan's resource base, geographical position and transport infrastructure can be considered not merely through the traditional framework of EU external relations but through the emerging framework of **strategic industrial interdependence**. The Critical Raw Materials Act provides a particularly strong legal connection because it treats diversified external supply as part of the Union's industrial resilience.

Application in practice

Currently the EU can address support for the technological transition, create Europe-scale support for an industry, use state aid strategically but condition it, protect European competitiveness and supply chains, manage the social consequences of restructuring. This is significant for your **powers–norms–meanings** framework. The EU's **power** is not to tell Volkswagen whether it can dismiss workers. Its power is to shape the economic environment through regulation, funding, competition policy, trade policy and coordination. The **norm** is that intervention should preserve competition and the Single Market rather than simply protect national champions. And the changing **meaning** of industrial policy is that Europe increasingly sees competitiveness, technological capacity, resilience and employment as strategic European concerns. For instance, the EUCO intervened on in an industrial action at a car factory Vilvoorde, Belgium asking the EU Commission to take action.

Table

Business case	Technology & innovation	Batteries / clean technologies	State aid & finance	Supply chains / trade	Workers & skills
Volkswagen DE	**Very strong EU role.** EU can fund R&D, digitalisation and innovation and coordinate common standards. The current automotive policy explicitly prioritises innovation and digitalisation. (Mobility and Transport)	**Very strong.** EU can support EV and battery ecosystems and clean mobility.	**Strong but conditional.** Germany can support Volkswagen-related investment, but aid must satisfy EU state-aid rules. CISAF allows support for decarbonisation and clean-tech manufacturing until 2030. (Competition Policy)	**Strong.** EU can address supply-chain resilience and external competition through trade and internal-market policy.	**Strong.** EU can finance training and reskilling, but cannot prevent Volkswagen from restructuring.
Airbus FR	**Very strong.** Probably the strongest case for EU-level R&D cooperation because aerospace requires enormous investment and European scale.	**Medium.** EU can support sustainable aviation technologies, but batteries are not the central issue.	**Strong.** EU and Member States can support R&D and investment, but subsidies must respect competition rules.	**Very strong.** The EU can negotiate trade rules and protect European access to strategic markets and inputs.	**Strong.** EU programmes can support highly specialised engineering and technical skills.
Eni IT	**Strong.** EU can support hydrogen,	**Very strong.** Eni fits the EU's clean-energy and	**Strong but conditional.** EU rules allow	**Very strong.** Energy security and	**Medium–strong.** EU can support reskilling, but

	carbon capture, renewable energy and other technologies.	decarbonisation agenda.	Member States to support clean energy and industrial decarbonisation through CISAF.	diversification of energy suppliers are areas where EU-level coordination is particularly important.	employment restructuring remains largely national/company-level.
Iberdrola ES	**Very strong.** EU can support smart grids, energy innovation and digital infrastructure.	**Very strong.** Renewables, hydrogen and energy storage directly fit the Clean Industrial Deal.	**Very strong.** This is one of the areas where current EU rules provide significant room for national support. CISAF explicitly covers clean energy and clean-tech manufacturing. (Competition Policy)	**Strong.** EU can coordinate energy infrastructure and critical supply chains across Member States.	**Strong.** EU can support skills for renewable energy and infrastructure.
Volvo Group SE	**Very strong.** EU can support electric vehicles, automation, digitalisation and connected transport.	**Very strong.** Electrification and batteries are central to Volvo's transition.	**Strong but conditional.** Sweden can support qualifying clean-tech investments, subject to EU rules.	**Very strong.** EU can strengthen supply chains for batteries, components and critical materials.	**Very strong.** The transition from conventional to electric heavy vehicles creates substantial reskilling needs.

Comparative evaluation

The **Volkswagen case** gives the EU a **large but constrained role**. The EU can help change the conditions under which Volkswagen competes, but it cannot simply tell Volkswagen to preserve German jobs. The best EU intervention is therefore **technology + clean mobility + supply chains + skills**, with state aid conditional on transformation. The Commission's automotive package follows almost exactly this logic.

Airbus provides perhaps the strongest justification for **European-level coordination**. The problem is one of scale: R&D, investment and global competition are too large to address efficiently through purely national policies. The EU can therefore add value through common research, financing, procurement and trade policy. Here, EU intervention is more about **creating European capacity** than rescuing an individual company.

Eni is different because the central issue is **energy security and the energy transition**. The EU has considerable scope to act because energy, climate and industrial policy are increasingly interconnected. EU intervention can encourage Eni to move toward hydrogen, renewables and other low-carbon technologies. However, the EU should be careful not to use industrial policy simply to preserve fossil-fuel business models.

Iberdrola is arguably the case where the EU has the **greatest policy compatibility**. Renewable energy, grids, clean technology, investment and skills all fit directly into current EU priorities. CISAF specifically enables Member States to support clean energy, industrial decarbonisation and clean-technology manufacturing.

Volvo is particularly strong for analysing **technological transformation**. The EU can support electrification, batteries, charging infrastructure, R&D and skills. However, it cannot guarantee that Volvo remains globally competitive. The EU can create favourable conditions, but ultimately the company has to innovate and compete.

Which cases give the EU the strongest justification?

I would rank them like this:

1. Iberdrola — strongest compatibility with current EU policy
Green energy, grids, decarbonisation and clean technology directly fit existing EU instruments.

2. Volvo — strong European added value
Electrification, batteries, technology and supply chains cross national borders.

3. Airbus — strong strategic case
European scale and technological sovereignty justify coordination, although the EU must avoid distorting competition.

4. Eni — strong but politically more difficult
Energy security supports intervention, but there is tension between supporting a major energy company and accelerating decarbonisation.

5. Volkswagen — important but most difficult politically
The EU has a strong industrial interest, but it cannot use industrial policy simply to protect jobs or an inefficient business model.

The key evaluation criterion

The strongest justification for EU intervention exists when **three conditions come together**:

European added value + market/coordination failure + strategic importance.

If all three are present, EU intervention is easier to justify. If only one is present—for example, a company simply becoming uncompetitive—the EU should be much more cautious.

This also explains the current compromise in EU policy. The EU is becoming more willing to **shape markets**, but it still operates within competition and Single Market rules. CISAF, for example, expands the possibilities for state aid but explicitly aims to ensure that support remains **necessary, suitable and fair** so that competition in the Single Market is not unnecessarily distorted.

So your overall argument could be:

The EU can intervene most effectively when a company's problem represents a wider European industrial problem. Its role is therefore not to rescue individual firms, but to transform the technological, financial, supply-chain and skills environment in which European firms compete.

Why Industry Politics matter

The European Union is primarily a service-based economy, but industry remains a crucial pillar of its economic model. Industry accounts for roughly one quarter of EU economic output and around one fifth to one quarter of employment. Manufacturing is the core of European industry and plays an outsized role in exports, innovation, and productivity growth. The EU's industrial strength is concentrated in sectors such as automotive, machinery, chemicals, pharmaceuticals, aerospace, and advanced manufacturing. Germany, Italy, and several Central European countries remain particularly dependent on industrial production.

European industry faces growing competition from the United States and China, both of which are pursuing active industrial strategies. High energy costs, technological dependence, and geopolitical tensions have increased concerns about Europe's industrial future. Recent EU industrial policies aim to strengthen resilience, reduce strategic dependencies, and support the green and digital transitions. The debate is no longer only about economic efficiency but increasingly about technological sovereignty, security, and strategic autonomy. A central question for Europe is whether it can preserve a strong industrial base while remaining competitive in a rapidly changing global economy.

Table

Industrial bloc	**Examples**
Advanced manufacturing	Machinery, robotics, industrial equipment

Transport	Cars, trucks, aerospace, rail
Energy-intensive industries	Steel, chemicals, cement, glass, paper
High-tech manufacturing	Pharmaceuticals, semiconductors, medical devices

The automotive, machinery, chemicals, and energy-intensive sectors have historically been the backbone of EU industrial competitiveness. One reason EU industrial policy has become so prominent is that manufacturing employs only about one-fifth of workers but generates nearly one-quarter of business value added and a disproportionate share of exports, innovation, and productivity growth. The debate is therefore not merely about the size of industry, but about whether Europe can maintain technological sovereignty and strategic autonomy if these sectors continue to shrink relative to the US and China.

Because manufacturing matters for far more than the number of people it directly employs.

First, manufacturing is a major source of **productivity growth**. A worker in advanced manufacturing often generates more value added than a worker in many service sectors. As a result, a sector employing 20% of workers can contribute disproportionately to economic growth and living standards.

Second, manufacturing sits at the center of **innovation ecosystems**. Much research and development takes place in sectors such as automotive, aerospace, pharmaceuticals, machinery, semiconductors, and advanced materials. When manufacturing declines, research, engineering, and technical capabilities often follow.

Third, manufacturing drives **exports**. Europe earns much of its income from selling cars, industrial machinery, chemicals, pharmaceuticals, and luxury goods abroad. A country that loses its manufacturing base often becomes more dependent on foreign producers for tradable goods.

Fourth, manufacturing supports a much larger network of activities. Every factory job is linked to suppliers, logistics, business services, software, engineering, maintenance, and finance. The strategic importance of manufacturing therefore exceeds its direct employment share. Fifth, manufacturing is closely tied to **technological sovereignty**. A continent that cannot produce critical technologies—such as chips, batteries, pharmaceuticals, or defence equipment—may find itself dependent on foreign powers during crises. Sixth, manufacturing is central to **national and European security**. Recent disruptions—from the pandemic to the war in Ukraine—highlighted the risks of relying on external suppliers for essential products and infrastructure. Seventh, manufacturing often provides relatively well-paid jobs outside major metropolitan areas. Its decline can therefore have significant social and regional consequences.

This is why debates about European industrial policy are ultimately not just about jobs. They are about whether Europe can retain the productive capabilities, technological know-how, export strength, and strategic autonomy that underpin economic and geopolitical power.

Europe can prosper while importing many manufactured goods. Services, finance, software, and intellectual property can generate enormous economic value without domestic production. So **manufacturing everything domestically is neither realistic nor necessary**.

The problem arises when Europe loses the **capability to produce strategically important goods**. If critical technologies are designed, financed, and manufactured elsewhere, Europe may remain wealthy but become increasingly dependent on decisions made outside Europe.

That creates several vulnerabilities. In a crisis, foreign suppliers can restrict access to essential technologies. Europe may also lose engineering expertise and industrial know-how that are difficult to rebuild once production ecosystems disappear. And dependence on foreign technology can constrain Europe's ability to pursue independent economic, environmental, or geopolitical policies.

This is why the issue is not really **"manufacture everything in Europe."** It is about maintaining sufficient capabilities in strategically important areas such as semiconductors, energy technologies, pharmaceuticals,

defence, telecommunications, advanced machinery, and critical materials.

The EU produces around **15% of the world's passenger cars**, making it a major global industrial power. It produces roughly **11.4 million cars annually**, out of about 75.5 million worldwide. European manufacturers supply around **three-quarters of cars sold within the EU**, showing the importance of the internal market.The automotive sector supports around **13.6 million direct and indirect jobs** across Europe. Cars and automotive products generate a major EU export surplus, strengthening Europe's trade position. European carmakers also support extensive supply chains in machinery, electronics, chemicals, steel and advanced technology. However, China is rapidly increasing its global share, particularly in electric vehicles and battery technology. Therefore, protecting Europe's automotive industry through innovation, investment and secure supply chains is crucial to maintaining European strategic power.

The strategic dialogue with the automotive industry has concluded, but it has revealed a troubling lack of strategic foresight at the helm. Rather than anticipating the structural changes facing the sector, policymakers appeared to react to them as they unfolded. The discussions exposed a persistent gap between political ambition and industrial reality, and between the drivers of competition of which sustainability has been an integral part for several decades, and the responsiveness of political institutions. Europe's automotive industry is undergoing profound technological and geopolitical transformation. Yet the response from those responsible for steering the sector has often been fragmented and short-term. The dialogue therefore highlighted not only the challenges facing the industry, but also the weaknesses in the strategy meant to address them. Without a coherent long-term vision, Europe risks losing competitiveness in a sector that remains central to its economy. The conclusion of the dialogue should therefore mark the beginning of a more ambitious and forward-looking industrial strategy, rather than the end of the conversationAccording to the Strategic Dialogue and the Commission's 2025 Automotive Industrial Action Plan, the EU's priorities can be summarised as follows. The Commission explicitly organised the plan around innovation and digitalisation, clean mobility, competitiveness and supply-chain resilience, skills and the social dimension, and a level playing field.

The first priority is technological leadership. Europe needs to regain an advantage in software-defined, AI-powered, connected and autonomous vehicles, while strengthening its capabilities in batteries, semiconductors and other critical technologies. The second is to keep manufacturing in Europe. The objective is not simply to have European car brands, but to maintain a strong European production base, including the suppliers and engineering capabilities that surround it. The third is resilient supply chains. Europe needs to diversify sources of critical raw materials and components and develop strategic partnerships with third countries rather than becoming excessively dependent on one supplier or market.

The fourth is cheaper and cleaner energy. The transition to electric and low-emission vehicles must not make European production structurally more expensive than production in the US or China. The Commission therefore links decarbonisation directly to industrial competitiveness. The fifth is investment and finance. Europe needs to mobilise private and public capital for batteries, software, AI, charging infrastructure, manufacturing and research so that European technological innovation can actually be commercialised at scale.The sixth is skills. The transition from combustion engines to electric, digital and increasingly automated vehicles changes the workforce. The Commission therefore places significant emphasis on reskilling, upskilling and attracting engineers and technological specialists.

The seventh is fair global competition. Europe intends to remain open to international trade while using trade-defence instruments and other measures where foreign competition is distorted by subsidies or other unfair practices. It also wants better access to overseas markets. The eighth is strategic openness rather than isolation**.** This is where Africa and other emerging markets fit. The Commission is explicitly pursuing free-trade agreements, strategic partnerships, critical-raw-material partnerships and clean trade and investment partnerships to diversify European sourcing and open markets.

So the broader strategy is essentially:

Europe should innovate at home, manufacture competitively at home, secure critical technologies and inputs, develop its workforce, and use international partnerships to diversify markets and supply chains.

That is important for your argument about **European strategic power**. The Commission is not proposing autarky. It is trying to create a Europe that is **strong enough to remain open**: technologically capable, industrially competitive, financially able to invest, and sufficiently resilient that external dependencies do not

become strategic vulnerabilities. [1]

Figure We will sack 120.000 people , VW's CEO Oliver Blume announced



Fahren , Fahren auf den Autobahn

Volkswagen's problems are not due to a single mistake. They stem from a combination of **Chinese competition, the electric-vehicle transition, high costs, organizational complexity, and weaker demand in key markets**. For two decades, Volkswagen's business model relied heavily on China. China was not only its largest market but also one of its most profitable. Today, however, Chinese manufacturers such as BYD, Geely and others have become highly competitive, particularly in electric vehicles and software-enabled cars. Many Chinese consumers increasingly prefer domestic brands, and Volkswagen's earnings from China have fallen dramatically. The second challenge is the transition to electric vehicles. Volkswagen invested heavily in electrification, but Chinese competitors moved faster in batteries, software integration and cost reduction. At the same time, EV demand in some markets has grown more slowly than expected, creating pressure on profitability. A third issue is cost. Volkswagen has long carried higher labour and production costs than many rivals. Its management has repeatedly argued that the company needs to reduce complexity, improve efficiency and accelerate decision-making to remain competitive. There is also a governance problem. Volkswagen's ownership structure involves the Porsche-Piëch family, the State of Lower Saxony and powerful labour unions. This arrangement provides stability but can make rapid restructuring more difficult than at some competitors. Yet Volkswagen is far from collapse. It remains one of the world's largest automakers, sells around 9 million vehicles annually, has substantial cash reserves, and owns strong brands including Volkswagen, Audi, Porsche, Škoda, SEAT/CUPRA, Bentley, Lamborghini and Scania. The company is restructuring, launching new EVs, investing in software and batteries, and trying to rebuild its position in China. For a discussion of European industrial policy, Volkswagen is a useful example: its difficulties illustrate how manufacturing alone is no longer enough. Competitive advantage increasingly depends on software, batteries, artificial intelligence, supply chains, intellectual property and speed of innovation. In many ways, Volkswagen's struggle reflects Europe's broader challenge in adapting its industrial strengths to a more technologically competitive world.

Volkswagen already has a foundation there on other continents: it operates assembly facilities in South Africa, Kenya, Rwanda and Ghana, and its Kariega plant in South Africa supplies the Polo to European and Asia-Pacific markets. The opportunity is particularly interesting because Africa combines a growing consumer market, young populations, industrialisation potential and access

[1] https://transport.ec.europa.eu/transport-themes/action-plan-future-automotive-sector_en

to critical minerals. The African automotive market is also attracting increasing investment, particularly around Morocco and South Africa.

First, use Africa as a lower-cost manufacturing and export platform. Rather than producing only for African consumers, VW could manufacture selected models in Africa for export to Europe and other markets. South Africa already demonstrates that this can work: the Kariega plant exports the Polo to Europe and Asia-Pacific. Second, look seriously at Morocco. Morocco is becoming one of Africa's strongest automotive manufacturing hubs. Volkswagen should consider Morocco not simply as a market but as a potential location for components, electric vehicles and battery-related production. Interestingly, VW's African management has itself identified Morocco as a potential alternative location for future investment when comparing the economics of South Africa. Third, develop African supply chains. VW should gradually increase local production of components rather than relying almost entirely on imported kits. That means developing suppliers for wiring, interiors, electronics, batteries, metal components and eventually powertrains. This would lower costs while creating industrial ecosystems and skilled employment.Fourth, build around affordable vehicles rather than simply exporting expensive European models. Africa needs reliable, relatively inexpensive vehicles adapted to local conditions. VW should develop vehicles specifically for African and emerging markets rather than simply selling European models there.Fifth, use Africa for the energy transition. VW could partner with African countries on electric and hybrid vehicles, charging infrastructure and renewable energy. Rwanda, for example, has already been used by Volkswagen as an innovation hub for sustainable mobility projects. Sixth, invest in skills and engineering. The strategic opportunity is much greater if VW trains African engineers, technicians and software developers. Africa could eventually become not merely a place where Volkswagen assembles cars, but a location where parts of the vehicles' engineering, software and digital systems are developed.This fits Volkswagen's broader strategy of building a resilient global production network and adapting products to regional markets. The bigger European argument is compelling: Europe should not view Africa merely as a market for European products. It should help build African industrial capacity while integrating that capacity into European supply chains. That would create markets for European companies, diversify supply chains, develop new sources of talent and raw materials, and strengthen Europe's geopolitical relationship with Africa. In that sense, Africa could become part of Europe's answer to China: not through dependency, but through mutually beneficial industrial partnerships.

Now, the EU should protect its automotive industry through targeted measures rather than broad protectionism.It should strengthen European batteries, semiconductors, software and critical materials while diversifying suppliers instead of pursuing autarky. Trade restrictions should be proportionate, temporary and reversible, with regular reviews and sunset clauses. The EU should distinguish between normal commercial competition and genuine national-security threats, avoiding the securitisation of every Chinese competitor. Where unfair subsidies or market barriers exist, Brussels should seek reciprocity and negotiated market access before escalating to broader restrictions. European competitiveness should also be strengthened through cheaper energy, less regulatory complexity, investment in R&D, skills and charging infrastructure. The EU should maintain dialogue with China and preserve cooperation in areas where interests overlap, ensuring that automotive disputes do not contaminate the entire relationship.Ultimately, Europe's objective should be competitive interdependence: remaining open to global trade while ensuring that no single foreign actor can make the European automotive industry strategically vulnerable.

Intellectual property rights are particularly important in the automotive industry because much of a car’s value lies not simply in the physical materials, but in the technology, design, software, engineering and brand behind the vehicle. In the car industry, intellectual property includes vehicle designs, patents, software, battery technology, electronic systems, manufacturing processes and trademarks. A European manufacturer may invest billions in developing a new vehicle, only for competitors to study and imitate aspects of its design or technology. Strong intellectual property protection allows companies to recover these investments and provides an incentive to continue innovating. Design protection is especially important. The distinctive shape of a vehicle, its interior design, lighting systems and other visual characteristics can form a significant part of a brand’s identity. Consumers often choose a BMW, Mercedes-Benz, Renault or Ferrari partly because of its distinctive design. Protecting these designs therefore protects not only aesthetics but also the economic value and reputation accumulated by the manufacturer. BMW’s distinctive kidney grille and Hofmeister kink are longstanding design signatures that help make its vehicles immediately recognisable. Mercedes-Benz is associated with its long bonnet, sculpted body lines and flowing side profile, while Renault has developed a distinctive C-shaped lighting signature and sculpted bodywork across many of its modern models. Ferrari’s low aerodynamic proportions, pronounced side air intakes and highly sculpted bodywork are central to its design identity. These examples show that automotive

design itself carries significant intellectual and commercial value, because consumers can recognise a manufacturer's design language even without seeing its badge.

Rolls-Royce has retained several trademark visual features both before and after BMW took control in 2003.The most iconic is the Pantheon grille—the tall, upright radiator grille inspired by classical Greek temples. This has been a defining Rolls-Royce feature since the early twentieth century and remains central to modern BMW-era Rolls-Royce models. Another hallmark is the long bonnet, short front overhang and formal, upright proportions, designed to convey presence, dignity and effortless power. Pre-BMW models such as the Silver Spirit and Silver Seraph displayed these characteristics, and BMW preserved them in the Phantom, Ghost and Cullinan. The rear-hinged "coach doors" are another distinctive Rolls-Royce feature. While not unique to every model throughout the company's history, BMW revived and popularised them on modern Rolls-Royce cars as a signature element. A further design cue is the emphasis on a high waistline, large glasshouse and commanding seating position, creating a sense of being carried rather than driving aggressively. This reflects Rolls-Royce's traditional focus on comfort and prestige. The main difference after BMW's takeover was not the abandonment of Rolls-Royce design, but its modernization. BMW's designers preserved the marque's classic proportions and visual identity while making the cars larger, more technically sophisticated and visually cleaner. In that sense, the trademark features remained largely the same, but were reinterpreted for the twenty-first century rather than replaced. This is actually a good example of intellectual property and industrial value: BMW did not buy Rolls-Royce because of a particular engine or factory. It bought a century of design heritage, craftsmanship, brand identity and distinctive visual language that customers could recognize instantly.

Patents are equally important for the technological side of the industry. European carmakers invest heavily in electric drivetrains, batteries, charging systems, autonomous driving, safety technologies, sensors and advanced manufacturing. Patents can give firms temporary exclusive rights over these inventions, allowing them to benefit from technological leadership and licensing opportunities. Intellectual property therefore has a strategic dimension. If Europe develops important automotive technologies but fails to protect or commercialise them, the economic benefits may be captured elsewhere. Conversely, strong European intellectual property rights can help European companies retain value from their research and maintain competitive advantages in global markets. Europe does not only need to manufacture cars; it needs to **own the technologies, designs, patents, software and brands that make those cars valuable**. Manufacturing creates physical capability, while intellectual property allows Europe to capture and defend the knowledge and economic value embedded within that production.

Figure Close-up of Renault C-Headlight



There is also a deeper political-economy question:

Can Europe exercise political sovereignty without possessing the productive capabilities necessary to implement its political choices?

If the answer is no, then industrial policy becomes more than an economic policy. It becomes a question of sovereignty and power.

How much economic efficiency should Europe be willing

to sacrifice in order to preserve strategic autonomy—and who should bear the cost?

The key point is that **Europe probably should not choose between efficiency and autonomy as if they were opposites**. The real question is how much additional cost is justified for reducing strategically dangerous dependencies.

A useful way to frame it is:

First, distinguish strategic from non-strategic production. Europe does not need to manufacture every consumer product domestically. It may be perfectly rational to import textiles, electronics, or other goods where dependence poses little strategic risk. But semiconductors, pharmaceuticals, energy systems, defence technologies, and critical infrastructure are different.

Second, accept some redundancy. Pure market efficiency often means sourcing from the cheapest supplier and maintaining minimal inventories. Strategic resilience requires some spare capacity, diversified suppliers, and domestic capabilities. That inevitably costs more—but it can be viewed as an **insurance premium** against geopolitical shocks.

Third, ask who pays. If industrial policy is financed through public subsidies, taxpayers bear the cost. If it takes the form of tariffs or local-content requirements, consumers may pay through higher prices. If governments support firms without conditions, shareholders may capture much of the benefit.

Why should European citizens pay more to preserve strategic industries if the gains ultimately accrue to private corporations?

A stronger industrial policy would therefore attach **conditions to public support**: investment in Europe, employment, research and development, technology transfer, supply-chain resilience, and perhaps limits on relocating production.

There is also a distributional issue between member states. Wealthier countries can afford larger subsidies, while poorer countries may struggle to compete. If industrial policy becomes simply a race to subsidise national champions, **European strategic autonomy could actually increase economic divergence within the EU**.

These two questions get to the heart of the EU's industrial-policy dilemma.

First, resilience has a cost. Maintaining domestic production, multiple suppliers, strategic stockpiles, or spare capacity is less efficient than simply buying from the cheapest producer. But the cheapest option in normal times may become extremely expensive during a crisis. The real calculation is therefore not **efficiency versus resilience**, but **the cost of resilience versus the cost of strategic dependence**.

Second, the distribution of costs matters. If governments subsidise European industry, citizens ultimately finance part of the policy through taxation or higher prices. But if the resulting benefits accrue mainly to large corporations and shareholders, the political legitimacy of industrial policy becomes questionable.

This suggests that **public support should come with public conditions**: investment, employment, R&D, technology development, European production capacity and resilience should be part of the bargain.

The second question goes deeper. If strategic autonomy benefits the EU as a whole, there is a strong argument that it should be financed partly at the **European level**. Otherwise, countries with greater fiscal capacity—particularly Germany and France—can subsidise their industries much more heavily than smaller or poorer member states.

That creates a paradox: an industrial policy intended to strengthen European sovereignty could instead fragment the Single Market.

Summary

The constitutional and legislative evolution demonstrates that the EU possesses a more substantial industrial-policy architecture than the relatively narrow wording of Article 173 might initially suggest. Article 173 remains the explicit constitutional foundation, but contemporary industrial policy is produced through the interaction of multiple Treaty competences and secondary instruments. The internal-market competence provides a legal basis for regulating strategic supply chains and technological ecosystems. Competition law constrains and increasingly structures State intervention. Research and innovation policy builds technological capacity. Environmental and energy law drives industrial transformation. Infrastructure policy supports industrial connectivity. Trade and investment law shape the external competitive environment. Strategic legislation increasingly addresses critical technologies, raw materials, clean manufacturing and economic security.

The institutional architecture is equally distributed. The Commission provides legislative initiative, policy coordination, State-aid control and implementation.

Parliament and Council jointly legislate across much of the field. The European Council provides strategic direction. Member States retain major implementation and financing powers. The European Investment Bank contributes financing capacity. Regional and social institutions provide additional coordination and consultation. The resulting system is therefore neither a centralised European industrial state nor a collection of wholly independent national industrial policies. It is a **multilevel system of coordinated industrial governance**.

The most significant transformation is that industrial policy is increasingly moving beyond the factory and beyond the territorial boundaries of the Union. The relevant legal question is no longer simply how Europe supports European firms. It is increasingly how Europe secures the **resources, technologies, energy, infrastructure, finance and external partnerships necessary for European industrial transformation**. The 2025 Competitiveness Compass and Clean Industrial Deal make this direction explicit by connecting innovation, decarbonisation, competitiveness, security and resilience. (European Commission)

For a study of EU–Kazakhstan–Central Asian relations, this legal evolution is therefore fundamental. Kazakhstan can be examined not simply as a partner in EU foreign policy, but as a potential component of an emerging European industrial ecosystem. The OTS can similarly be considered not merely as a regional political organisation, but as a possible institutional platform for connectivity, investment, resource cooperation and industrial integration. The emerging legal architecture consequently creates the possibility of analysing European industrial policy as a system of **strategic interdependence**, in which internal European legislation and external economic relationships increasingly form part of the same policy structure.

The central conclusion is therefore that the EU's industrial policy remains constitutionally constrained but is institutionally expanding. Its evolution has occurred less through the creation of a single new industrial competence than through the accumulation and coordination of legislation across multiple policy fields. The emerging system can consequently be described as a **distributed European industrial-policy constitution**, in which Article 173 provides the explicit foundation while internal-market, competition, research, environmental, energy, infrastructure, trade and economic-security provisions supply the substantive instruments. This gradual accumulation explains why European industrial policy can simultaneously remain rooted in open and competitive markets and become increasingly interventionist, strategic and geopolitical. It also explains why the future development of EU industrial policy is likely to depend as much on **coordination among EU institutions and Member States as on the adoption of additional sector-specific legislation**. The legal and institutional evolution therefore points toward a European model of industrial governance based not upon central planning but upon coordinated regulation, strategic investment, technological development, selective intervention, economic-security measures and increasingly structured external partnerships.

3. From the Regulatory State to Transformational Industrial Policy

The evolution from the **regulatory state** towards a more **transformational form of industrial policy** represents a fundamental change in the way governments conceive their role in the economy. Whereas the regulatory state sought primarily to establish and police the rules under which markets operate, contemporary industrial policy increasingly seeks to **shape the direction of economic development itself**. This does not necessarily imply a return to the interventionist, state-owned or planning-oriented models associated with the post-war period. Rather, it involves a hybrid form of state activism in which regulation is combined with public investment, strategic subsidies, technological missions, procurement, financial instruments and coordination across firms, governments and institutions.

The concept of the **regulatory state** is closely associated with the transformation of European political economies from the 1980s onwards. As Majone (1994, 1997) argued, European integration increasingly shifted economic governance away from direct state ownership and discretionary intervention towards rule-based regulation, competition policy and the creation of functioning markets. The state did not retreat from the economy so much as change the **mode through which it exercised economic authority**. Market-making regulation, liberalisation, privatisation and competition enforcement became central instruments of governance. In the EU context, this process was reinforced by the development of the Single Market and the growing authority of the European Commission over competition and state-aid policy.

Industrial policy consequently became increasingly **horizontal**. Rather than selecting particular sectors or firms for preferential support, governments were encouraged to improve the general "framework conditions" for economic activity: competition, infrastructure, skills, R&D, innovation and access to markets. European industrial policy during this period

therefore tended to privilege market integration and efficiency over strategic direction. The strengthening of EU competition and state-aid rules constrained the ability of Member States to deploy traditional industrial-policy instruments such as selective subsidies, public ownership and direct economic coordination (Landesmann and Stöllinger, 2020; Bulfone, 2022).

Yet this regulatory settlement did not eliminate industrial policy. Instead, it **redefined its permissible form**. From the 2000s onwards, European policy increasingly incorporated innovation policy, smart specialisation, regional development and public support for emerging technologies. This produced what can be understood as an intermediate or pragmatic model: the state remained committed to competitive markets but increasingly recognised that markets alone might not generate the technological capabilities, investment and structural transformation required for long-term growth. The resulting policy mix combined competition with selective forms of intervention, particularly in research, innovation and regional development (Landesmann and Stöllinger, 2020; Di Carlo, McNamara and Moschella, 2026).

The decisive shift, however, has occurred since the **2020s**. A succession of overlapping disruptions—the COVID-19 pandemic, global supply-chain vulnerabilities, the energy crisis, Russia's invasion of Ukraine, intensifying US-China technological competition and the accelerating climate transition—has challenged the assumptions underpinning the previous regulatory paradigm. Industrial policy has consequently become associated not simply with correcting market failures, but with addressing questions of **economic security, technological sovereignty, resilience, decarbonisation and geopolitical power**. Di Carlo, McNamara and Moschella (2026) describe this as the emergence of a distinct **Transformational Phase** in EU industrial policy, characterised by the geopoliticisation of policy objectives, hybrid fiscal and regulatory instruments, and a reconfiguration of authority between the EU and its Member States.

The conceptual shift is therefore from **market-making to market-shaping**. A regulatory state asks whether markets are functioning according to appropriate rules; a transformational state asks whether the existing structure of production is capable of delivering collectively defined economic, technological and societal objectives. Industrial policy becomes explicitly concerned with the **directionality of economic change**. This is particularly visible in policies surrounding the green and digital transitions, where governments are not merely correcting negative externalities but attempting to accelerate the development of entirely new technological and industrial ecosystems.

This logic resonates with the work of Mazzucato (2013, 2018), who argues that the state should not be understood simply as a fixer of market failures. In areas characterised by high uncertainty, long investment horizons and substantial technological risk, public authorities can play a role in **creating and shaping markets**, undertaking investments that private actors may initially be unwilling or unable to make. Mission-oriented policy therefore seeks to establish a direction for innovation while mobilising public and private resources around that direction.

The European Union provides a particularly important case because this transformation is occurring within a political system historically associated with regulatory rather than developmental intervention. As recent scholarship argues, the EU represents something of a "least-likely case" for the return of activist industrial policy: its institutional architecture was constructed around market integration, competition, fiscal discipline and restrictions on national intervention. The recent resurgence of industrial policy therefore represents not simply a change in individual policies but a broader transformation in the **political economy of European integration**.

The new model is also distinguished by the **hybridisation of policy instruments**. Traditional regulation remains important, but it is increasingly supplemented by public investment, EU-level borrowing, strategic state aid, public procurement, investment guarantees, development finance and geoeconomic instruments. NextGenerationEU, for example, enabled the European Commission to borrow up to €750 billion on capital markets, with the Recovery and Resilience Facility directing substantial investment towards climate and digital objectives. More recently, the EU has developed instruments intended to strengthen European defence-industrial capabilities and strategic economic security. These developments indicate that fiscal capacity itself is becoming an instrument of industrial policy.

Equally important is the transformation of **state-aid governance**. Under the traditional regulatory model, state aid was principally viewed as a potential distortion of competition that required close supervision. Increasingly, however, flexibility in the state-aid regime is being used to enable Member States to pursue shared European strategic objectives. The result is not the abandonment of competition policy but its partial **reorientation towards strategic coordination**. Regulation becomes a mechanism for enabling intervention rather than simply constraining it. Di Carlo, McNamara and Moschella (2026) consequently describe the contemporary Commission as

moving from a role that constrains national intervention "from above" towards one that enables, coordinates and directs national intervention within a European framework.

This transformation can therefore be understood across three interconnected dimensions: **goals, instruments and authority**. First, the goals of industrial policy have expanded from efficiency and competitiveness towards resilience, strategic autonomy, technological sovereignty, energy security and the green transition. Second, the instruments have shifted from predominantly regulatory and horizontal measures towards a hybrid portfolio combining regulation, finance, subsidies, procurement and investment. Third, authority has become more networked and multilevel: rather than replacing Member State intervention with centralised EU intervention, the contemporary model increasingly involves the Commission, national governments, firms, development banks and other public institutions operating within interconnected industrial ecosystems.

The emerging **transformational industrial-policy state** should therefore not be interpreted as a simple return to the interventionist state of the twentieth century. The state is not necessarily seeking to own firms, replace markets or centrally plan production. Instead, it seeks to **orient market processes towards strategic objectives** while retaining private investment, competition and decentralised decision-making. In this sense, transformational industrial policy represents a synthesis of regulation and intervention: markets remain central, but the state increasingly attempts to influence the technological trajectories, investment patterns and productive capabilities that markets generate.

This distinction is crucial. The question is no longer simply whether the state should intervene in markets, but **what kind of markets should be constructed, for what purposes, and with whose interests in mind**. Industrial policy is inherently political because decisions about which technologies, sectors, regions and firms receive support inevitably distribute economic opportunities and risks. As Di Carlo, McNamara and Moschella (2026) emphasise, industrial policy should therefore be analysed not only in terms of its instruments but also in terms of **"for what, through what means, by and for whom."**

The move from the regulatory state to transformational industrial policy thus represents a broader redefinition of the state's economic role. The regulatory state sought to **discipline and enable markets**; the transformational state increasingly seeks to **shape their direction**. In Europe, this transition is being driven by the convergence of climate change, technological competition, geopolitical rivalry and concerns over economic resilience. Whether this new model can reconcile strategic intervention with competition, fiscal sustainability and democratic accountability remains an open question. What is clear, however, is that industrial policy has moved from the margins of European economic governance towards its centre.

4. Analytical Framework

From the Regulatory State to Strategic Interdependence: An Analytical Framework for EU Industrial Policy

This study begins from the premise that the transformation of European Union industrial policy has moved faster than the conceptual frameworks traditionally used to explain it. The literature has accumulated substantial knowledge on the changing role of the state, the resurgence of industrial policy, strategic autonomy, economic security, technological sovereignty, green industrial transformation and new forms of EU intervention. Yet these strands have largely developed alongside rather than through one another. The result is a fragmented analytical landscape in which the internal transformation of European industrial policy, the externalisation of economic strategy, the geopolitics of interdependence and the infrastructures underpinning strategic supply chains are often examined separately.

The purpose of this framework is therefore not to add another generic account of the "return of industrial policy". It is to accumulate the insights of existing approaches, identify precisely where they become insufficient, and connect them into a framework capable of explaining the internal and external dimensions of contemporary EU industrial policy. The argument proceeds from the regulatory-state literature, incorporates the developmental, entrepreneurial and mission-oriented perspectives, engages the emerging literature on the transformational state, and then extends these approaches through the concepts of strategic interdependence, dependency governance and industrial connectivity.

The analytical handles

The analysis is organised from the outset around seven analytical handles: direction, capability, dependency, instruments, connectivity, governance and reconfiguration. These handles are deliberately specified before the literature is reviewed because they provide the conceptual structure through which the different theoretical traditions are accumulated and subsequently operationalised empirically.

Direction identifies the strategic objectives of EU

industrial policy and asks what the EU is trying to achieve. This includes competitiveness, technological leadership, decarbonisation, resilience, economic security and strategic autonomy. The shift in direction is central to the contemporary literature on the changing purposes of industrial policy and is particularly evident in the movement from horizontal competitiveness objectives towards explicitly geopolitical and transformational goals (Di Carlo, McNamara and Moschella, 2026). (Wiley Online Library)

Figure



Capability identifies the productive, technological, financial and infrastructural capacities that the EU seeks to construct and asks what capacities are necessary to achieve those objectives. This handle draws directly on developmental-state and mission-oriented approaches, which understand industrial policy as a means of shaping productive capabilities rather than simply correcting market failures (Mazzucato, 2013, 2018; Kattel and Mazzucato, 2018). Mazzucato's formulation is particularly important because mission-oriented policy involves not merely "fixing" markets but actively shaping and co-creating them around long-term technological and societal objectives (Mazzucato, 2018). (OUP Academic)

Dependency identifies the external resources, technologies, energy, intermediate inputs, markets and infrastructures on which those capabilities depend and asks what external relationships are required to construct and sustain European productive capacity. This is where the framework moves beyond conventional industrial-policy analysis. A semiconductor capability, for example, is inseparable from external technological and material inputs; battery production depends upon mineral extraction and processing beyond European borders; and clean-technology manufacturing depends upon globally distributed inputs and production networks. Dependency therefore becomes the analytical bridge between domestic capability construction and external economic relations.

Instruments identify the policy means through which the EU attempts to shape capabilities and dependencies and ask how strategic objectives are translated into intervention. These instruments include regulation, state aid, public investment, EU-level finance, procurement, standards, trade instruments, investment screening, strategic partnerships and economic diplomacy. This handle builds directly on the contemporary transformational-state literature, particularly Di Carlo, McNamara and Moschella's distinction between the goals, instruments and authority structures of contemporary industrial policy (Di Carlo, McNamara and Moschella, 2026). (Wiley Online Library)

Connectivity identifies the physical and digital infrastructures through which strategic value chains operate and asks what infrastructures make external economic relationships materially possible. This expands industrial-policy analysis beyond firms and markets to

include transport corridors, ports, logistics systems, energy networks and digital infrastructure. Connectivity is therefore treated not as a separate infrastructure policy but as a potential enabling condition of industrial capability and resilience.

Governance identifies the actors, institutional arrangements and distributions of authority through which industrial dependencies are managed and asks who governs strategic interdependence and through what institutional mechanisms. This builds on the regulatory-state literature's emphasis on dispersed European authority (Majone, 1997) while extending the analysis to contemporary forms of multilevel and transnational industrial governance. Majone's account is particularly important because the EU's regulatory model emerged precisely through a redistribution of economic governance away from direct state intervention and towards rule-making, regulatory institutions and European-level authority (Majone, 1997). (Cambridge University Press)

Reconfiguration identifies the consequences of intervention and asks whether EU industrial policy actually changes the structure of interdependence. The relevant outcomes are therefore not simply expenditure, legislation or policy adoption, but changes in productive capacity, supplier concentration, technological dependence, processing capability, infrastructure redundancy, investment relationships and supply-chain resilience.

The analytical architecture is therefore:

Direction → Capability → Dependency → Instruments → Connectivity → Governance → Reconfiguration

These seven handles are not intended as a rigid linear model. They represent analytically distinct but mutually reinforcing dimensions of a recursive process. Strategic objectives create capability requirements; capabilities generate dependency structures; dependencies create vulnerabilities or strategic opportunities; vulnerabilities generate policy responses; policy responses operate through infrastructures and governance arrangements; and these interventions may subsequently reconfigure the structure of interdependence.

The principal theoretical claim follows from this architecture:

Contemporary EU industrial policy should be understood not only as the construction of productive capabilities within Europe, but as the strategic governance and reconfiguration of the external interdependencies through which those capabilities are made possible and sustained.

This proposition provides the basis for accumulating the existing literature.

From the regulatory state to capability construction

The first theoretical point of departure is the literature on the regulatory state. Majone's analysis of the European regulatory state identified a major transformation in the mode of European governance: from the interventionist or "positive" state towards a state increasingly concerned with rule-making, regulation and the creation of market conditions (Majone, 1994, 1997). In his formulation, the changing European environment reduced the role of direct intervention while increasing the importance of regulation as a mechanism for governing increasingly integrated markets (Majone, 1997). (Cambridge University Press)

This perspective remains indispensable because contemporary EU industrial policy has not emerged outside the regulatory state. Rather, new interventionist instruments have been layered onto institutions originally constructed around market integration, competition and regulation. Contemporary EU industrial policy is consequently better understood as a transformation of the regulatory state than as its simple replacement.

This distinction matters theoretically. If the EU were simply returning to the traditional developmental state, one would expect a straightforward movement from regulation towards direct intervention. Instead, contemporary EU policy combines regulation, competition rules and market-making with subsidies, public investment, strategic procurement, industrial alliances and increasingly geopolitical instruments. The result is a hybrid configuration.

The second theoretical layer is therefore provided by the developmental and entrepreneurial-state literature.

Mazzucato (2013) challenges the conventional distinction between a dynamic private sector and a state limited to correcting market failures by demonstrating the state's capacity to undertake risk, shape markets and catalyse technological development. Her subsequent work on mission-oriented innovation policy argues that public policy should be understood not simply in terms of market fixing but also in terms of market creation and market shaping around collective objectives (Mazzucato, 2018).

Kattel and Mazzucato (2018) develop this argument further by identifying dynamic public-sector capabilities as central to the implementation of mission-oriented policies. Their argument is particularly relevant to the EU because the effectiveness of industrial policy depends not merely on the existence of financial resources but on

institutional capacities to coordinate investment, experimentation and market formation.

This literature provides the theoretical basis for the capability handle. Industrial policy becomes analytically meaningful not simply when the state intervenes, but when intervention is directed towards the construction of productive, technological and institutional capacities.

The relevant question therefore changes from:

What market failure is the EU correcting?

to:

What capability is the EU attempting to construct?

This shift is essential for analysing contemporary initiatives in semiconductors, batteries, clean technologies, hydrogen, defence, critical raw materials and other strategic sectors.

From capability construction to the transformational state

The recent literature on EU industrial policy provides the next layer of the argument. Di Carlo, McNamara and Moschella (2026) identify the 2020s as a distinct Transformational Phase in European industrial policy. Their framework conceptualises contemporary industrial policy through three dimensions: goals, instruments and authority structures. They argue that the EU is moving beyond its historical regulatory-state configuration through the geopoliticisation of interventionist goals, the emergence of hybrid fiscal, regulatory and geoeconomic instruments, and a redistribution of authority across European and national levels.

This contribution is particularly important because it provides a contemporary synthesis of several developments that had previously been analysed separately. It establishes that the transformation of EU industrial policy is not simply a quantitative increase in intervention but a qualitative change in the purpose, instruments and institutional organisation of intervention.

The present framework accepts this argument but identifies a further theoretical step.

If the transformational EU seeks to construct strategic productive capabilities, then the analysis cannot end at the domestic productive system. Capabilities are embedded in wider production networks. They depend upon materials, technologies, energy, intermediate inputs, infrastructure, investment and markets that are frequently located outside the EU.

The transformational-state literature therefore raises, but does not fully resolve, a fundamental question:

What external economic relationships are necessary for the capabilities that the EU seeks to construct?

This question introduces the dependency handle.

From capability to dependency

The dependency handle constitutes the principal extension of the existing industrial-policy literature.

The contemporary literature on economic security and strategic autonomy has demonstrated that economic interdependence can generate geopolitical vulnerability. The disruption of supply chains during the COVID-19 pandemic, Europe's dependence on Russian energy before and after Russia's invasion of Ukraine, and intensifying technological competition have all contributed to a reconceptualisation of economic openness as a potential source of strategic vulnerability.

The EU's Economic Security Strategy institutionalises this shift by treating supply-chain resilience, technology security, critical infrastructure and economic coercion as interconnected dimensions of European economic security.

The implication for industrial policy is profound

A policy designed to construct a domestic capability can simultaneously create or reproduce an external dependency.

European semiconductor capacity may reduce dependence on overseas fabrication while retaining dependence on specialised machinery and materials.

European battery production may expand domestic manufacturing while remaining dependent on mineral extraction and processing elsewhere.

European clean-technology manufacturing may increase production within Europe while remaining dependent upon imported components and raw materials.

The relevant analytical object is therefore not simply the domestic industry, but the strategic value chain and its dependency architecture.

This is the point where industrial policy and international political economy become inseparable.

The central question becomes:

How does the EU govern the external dependencies embedded in the capabilities it seeks to construct?

This leads to the central concept of the study: Strategic Interdependence Industrial Policy.

Strategic Interdependence Industrial Policy refers to the use of industrial, regulatory, financial, trade, diplomatic and infrastructural instruments to construct, diversify, secure and reconfigure the external economic relationships required to sustain strategically important European productive capabilities.

The concept therefore extends the transformational-state argument outward.

The regulatory state governs markets.

The transformational state shapes markets and constructs capabilities.

The strategic interdependence state constructs capabilities while governing the external networks on which those capabilities depend.

The conceptual progression is therefore:

Regulatory state → Transformational state → Strategic interdependence state

From dependency to instruments

The next analytical move concerns the instruments through which the EU attempts to alter these dependency structures.

This is where Di Carlo, McNamara and Moschella's (2026) framework of goals, instruments and authority structures becomes particularly valuable. Their analysis demonstrates that contemporary industrial policy involves a hybridisation of regulatory, fiscal and geoeconomic instruments rather than a simple shift towards subsidies.

The present framework extends this insight by asking what these instruments do to dependency structures.

State aid may increase domestic production.

Public finance may reduce investment barriers.

Regulation may create markets for strategic technologies.

Procurement may provide demand for emerging industries.

Trade policy may diversify suppliers.

Investment screening may protect strategic capabilities.

Strategic partnerships may stabilise external supply.

Economic diplomacy may create the institutional conditions for long-term investment.

Infrastructure finance may establish alternative supply routes.

The analytical task is therefore not to examine these instruments individually but to analyse their interaction as a policy configuration.

This is important because strategic resilience is unlikely to be produced by a single instrument. It emerges through combinations of industrial, financial, regulatory, trade and diplomatic interventions.

From instruments to connectivity

The connectivity handle provides another extension of the literature.

Industrial policy has traditionally focused on firms, sectors, technology and markets. Infrastructure is often treated as a related but separate policy domain. Yet external industrial dependencies cannot be governed without the infrastructures through which resources, intermediate goods, energy and technologies move.

Connectivity therefore becomes an enabling condition of strategic industrial capability.

A critical mineral deposit is not an industrial input merely because the resource exists. It requires extraction, processing, energy, transport, logistics, finance and access to markets.

Likewise, an alternative supplier does not automatically create resilience. The supplier must be connected to European production through sufficiently reliable transport, logistics, energy and digital infrastructure.

The implication is that supply-chain diversification should be distinguished between nominal diversification and effective diversification.

Nominal diversification occurs when alternative suppliers exist.

Effective diversification occurs when those suppliers can

be integrated into European production through viable infrastructure, finance, logistics and institutional arrangements.

Connectivity therefore becomes part of the industrial-policy mechanism itself.

From connectivity to governance

The sixth handle, governance, follows from the recognition that strategic interdependence cannot be governed by a single institution.

The regulatory state already demonstrated the importance of dispersed authority in European economic governance. Majone (1997) showed how the European regulatory model involved a shift towards specialised regulatory institutions and rule-based governance operating across multiple levels.

Contemporary industrial policy adds further complexity. The Commission, Member States, firms, financial institutions, regulatory bodies and external partners all participate in constructing strategic capabilities.

Di Carlo, McNamara and Moschella (2026) capture this transformation through their emphasis on the "vertical and horizontal decentering" of industrial-policy intervention.

The present framework extends this argument beyond EU borders.

Once industrial capabilities depend upon external resources, infrastructure and investment, governance becomes transnational.

The relevant question is therefore not simply:

Which institution has formal authority?

It is:

How are strategic industrial relationships coordinated across institutional, national and territorial boundaries?

This brings firms, financial institutions, partner governments and regional organisations into the analytical frame alongside EU institutions and Member States.

From governance to reconfiguration

The final handle is reconfiguration.

This is the outcome dimension of the framework.

Strategic industrial policy should not be evaluated simply by whether it increases intervention, spending or regulation. The critical question is whether *it changes the structure of interdependence.*

A successful intervention might reduce supplier concentration, increase domestic processing, create alternative transport routes, strengthen technological capacity, mobilise investment or establish new institutional partnerships.

It might also fail.

A policy could create new capacity while leaving critical dependencies untouched. It could diversify suppliers while creating new logistical bottlenecks. It could relocate production without increasing technological autonomy. It could even replace one dependency with another.

The concept of reconfiguration therefore prevents the analysis from assuming that industrial intervention automatically produces resilience.

The ultimate outcome variable becomes strategic industrial resilience: the capacity to maintain, expand and transform strategically important productive capabilities despite external economic, technological, geopolitical and supply-chain disruption.

This also produces a more precise understanding of strategic autonomy.

Strategic autonomy should not be equated with the elimination of external dependence. For an open and globally integrated European economy, such an objective would be unrealistic. Strategic autonomy is better conceptualised as the capacity to select, diversify, govern and reconfigure interdependence.

The theoretical contribution of the framework is therefore to move the debate from dependency reduction towards dependency governance.

The integrated analytical model

The seven handles can now be brought together into a single analytical mechanism:

Direction identifies the strategic objective.
Capability identifies what must be built.
Dependency identifies what that capability requires externally.
Instruments identify how the EU attempts to alter those dependencies.
Connectivity identifies the infrastructure required to

operationalise those relationships. Governance identifies the actors and institutional arrangements through which they are coordinated. Reconfiguration assesses whether the resulting intervention changes the structure of interdependence and increases strategic industrial resilience.

The resulting causal architecture is:

Strategic objective → capability requirement → dependency architecture → policy intervention → infrastructural mediation → governance → reconfiguration of interdependence → strategic industrial resilience

This architecture deliberately brings together the principal contributions of the literature rather than positioning the proposed framework as an alternative to them.

Majone's regulatory-state approach explains the institutional starting point: the EU developed as a polity in which market-making and regulation displaced much direct economic intervention (Majone, 1994, 1997).

Mazzucato's entrepreneurial and mission-oriented approach explains the shift towards capability construction and market shaping (Mazzucato, 2013, 2018).

Kattel and Mazzucato (2018) add the importance of public-sector capabilities for implementing transformative missions.

Di Carlo, McNamara and Moschella (2026) explain the contemporary EU transition towards a transformational state characterised by new goals, instruments and authority structures.

The strategic-autonomy and economic-security literature explains why external dependencies have become objects of geopolitical concern.

The contribution made here is to connect these literatures through the missing relationship between capability construction and dependency governance.

The result is a shift from analysing industrial policy as an essentially domestic intervention to analysing it as a form of strategic economic governance that simultaneously operates inside and beyond the EU's territorial boundaries.

That is the conceptual move from the regulatory state to strategic interdependence.

The central proposition is that EU industrial policy is operationalised through the interaction of multiple legal competences, policy instruments and institutions rather than through Article 173 TFEU alone. Each intervention can therefore be analysed according to its legal basis, policy instrument, responsible institutions, industrial objective and outcome.

The framework focuses on competitiveness, innovation, decarbonisation, resilience and economic security. These objectives can be observed through measures such as investment support, technological development, supply diversification, clean-technology production, energy security and foreign-investment screening.

Institutional coordination is another key dimension. The analysis examines how the Commission, Parliament, Council, Member States and European Investment Bank interact, including coordination between different policy areas such as industry, energy, climate, trade and competition.

The empirical analysis can focus on selected strategic sectors, particularly critical raw materials, semiconductors, clean technologies and energy. For each case, the analysis traces the relationship between an identified industrial challenge, the relevant EU legislation or policy instrument, institutional coordination and the resulting industrial activity.

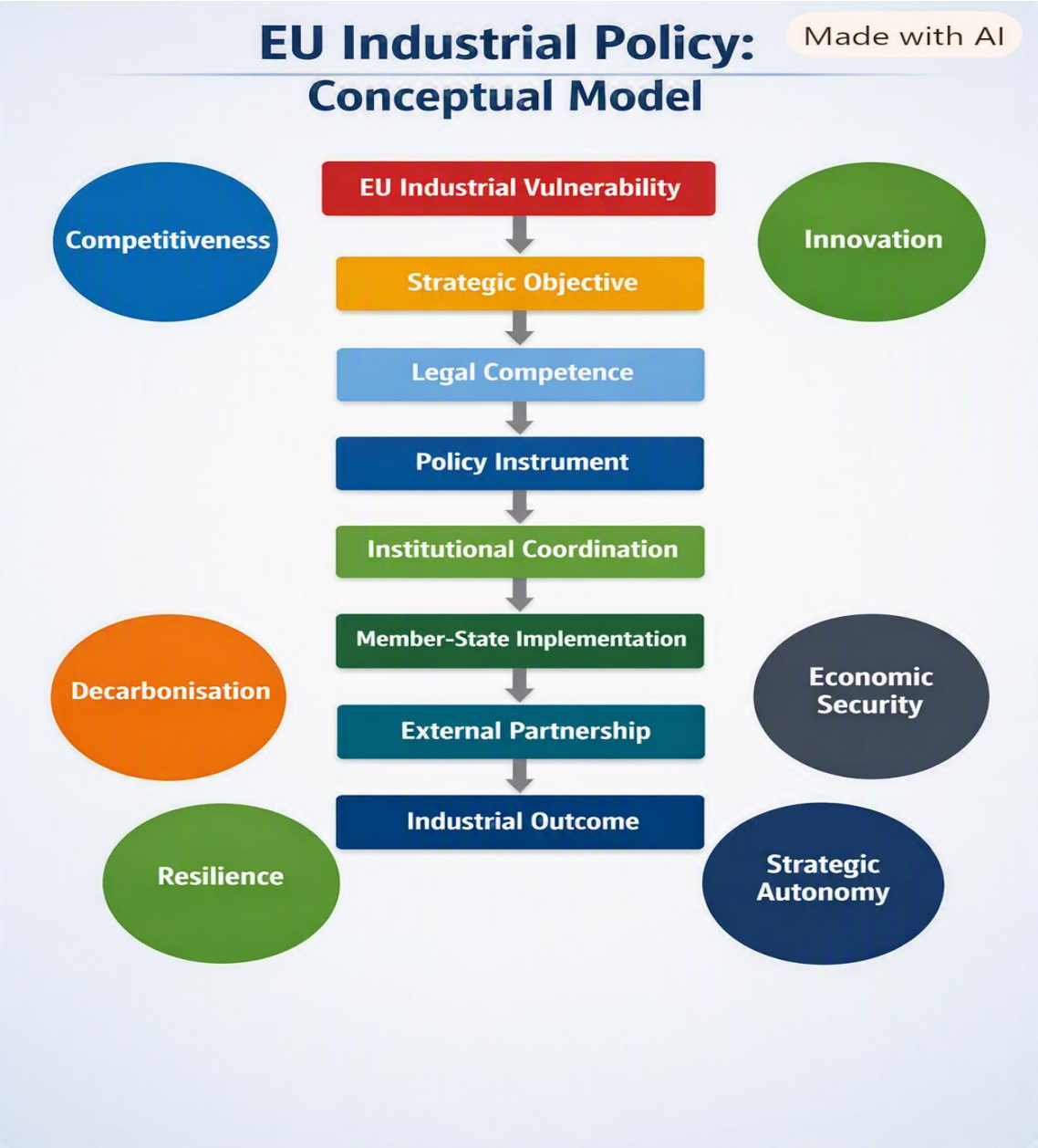
A distinction should be made between policy outputs and outcomes. The adoption of legislation, establishment of a programme or creation of a partnership constitutes an output, while increased investment, new production capacity, supply diversification or technological development constitutes an outcome.

The resulting analytical model is:

Industrial challenge → strategic objective → legal competence → policy instrument → institutional coordination → implementation → industrial outcome.

This approach transforms the legal analysis from a description of EU industrial policy into an operational framework for examining how law, institutions and policy instruments interact to produce European industrial-policy outcomes.

Figure



The framework can be operationalised by examining the **EU's dispersed industrial-policy architecture** across three interconnected dimensions: **legal foundations, institutional arrangements and policy implementation**. Rather than understanding Article 173 TFEU as the exclusive basis of EU industrial policy, the analysis considers how a range of Treaty provisions, legislative measures and institutional actors collectively determine the scope, direction and implementation of EU industrial policy.

5.The Evolution of EU Industrial Policy

The evolution of European Union industrial policy is best understood not as a sequence of discrete policy programmes, but as a **cumulative transformation in the purposes, instruments and governance of European economic intervention**. The EU did not move abruptly from a liberal or regulatory model towards interventionist industrial policy. Rather, successive crises, institutional developments and changes in the international political economy gradually altered the balance between market integration, competitiveness, resilience, economic security and strategic transformation.

This historical evolution provides the empirical foundation for the analytical framework developed above. In particular, it allows the seven analytical handles—**direction, capability, dependency, instruments, connectivity, governance and reconfiguration**—to be traced historically. The central argument is that the meaning of industrial policy has progressively widened. Early European integration concentrated on creating a functioning market and preventing national intervention from fragmenting it. The Lisbon Strategy subsequently

introduced a stronger concern with productivity, innovation and competitiveness. The post-2008 period strengthened the emphasis on industrial competitiveness and technological upgrading. The COVID-19 pandemic then exposed the vulnerabilities associated with international production networks, while Russia's invasion of Ukraine transformed resilience into a question of economic and strategic security. More recent initiatives have moved further towards active capability construction, decarbonisation, technological sovereignty and the geopolitical management of dependencies.

The resulting trajectory can be summarised as:

market integration → competitiveness → resilience → strategic security → industrial transformation

This sequence should not be interpreted as implying that earlier objectives disappeared. Rather, new objectives were layered upon existing ones. Competitiveness remains central to contemporary policy; market integration remains foundational; and regulatory governance continues to shape the implementation of industrial intervention. What has changed is the **strategic purpose attached to these instruments and the problems they are expected to solve**.

The Single Market: industrial policy through market integration

The origins of contemporary EU industrial policy lie partly in a paradox. European integration was initially designed to reduce the capacity of national governments to pursue protectionist and distortionary industrial policies, while simultaneously creating a larger market in which European firms could achieve economies of scale. Industrial policy was therefore embedded within the broader project of market integration rather than constructed as an autonomous interventionist policy domain.

The Single European Act of 1986 provided the institutional basis for completing the internal market by 1992, while the European Commission's programme for the internal market sought to remove physical, technical and fiscal barriers to cross-border economic activity. The logic was fundamentally one of **market-making**: European competitiveness would be strengthened by exposing firms to a larger integrated market, reducing transaction costs and preventing national protectionism from fragmenting production.

This configuration corresponds closely to what Majone (1994, 1997) subsequently conceptualised as the emergence of the European **regulatory state**. Rather than directly directing production, the European polity increasingly sought to establish common rules under which market actors could operate. Competition policy, state-aid control, harmonisation and mutual recognition became central mechanisms through which European economic activity was governed (Majone, 1997).

The Single Market therefore constituted an important form of industrial policy even though it was not generally labelled as such. Its industrial objective was indirect: **to create the market conditions under which European productive capabilities could develop**.

This distinction is important for understanding the subsequent transformation. Contemporary industrial policy did not emerge in opposition to the Single Market. It emerged through the institutional architecture that the Single Market created.

The first historical phase can therefore be characterised as:

Industrial policy through market integration.

The dominant analytical handle during this period was **direction**: the principal objective was to construct an integrated European market capable of supporting competitiveness and economies of scale.

Competition policy: disciplining industrial intervention

Competition policy constituted the second pillar of this model. The EU's competition regime sought to prevent state intervention, private concentration and national protectionism from undermining the Single Market. Articles 101 and 102 TFEU established prohibitions on anti-competitive agreements and abuses of dominant position, while Articles 107–109 created the EU framework for controlling state aid.

The state-aid regime was particularly consequential for industrial policy. As Blauberger (2009) demonstrates, state-aid control became a central mechanism through which the Commission constrained national industrial subsidies while simultaneously developing its own role in determining which interventions were compatible with European objectives. Competition policy thus operated not simply as a constraint on industrial policy but as a **European governance mechanism for industrial intervention**.

This produced an important institutional asymmetry. Member States possessed significant economic resources and retained responsibility for many industrial policies, but their interventions were increasingly subject to

European competition rules. The result was a system in which the EU could restrict national industrial intervention without possessing an equivalent centralized industrial-policy apparatus.

The historical significance of this model is considerable. It explains why the contemporary EU faces a distinctive institutional problem: the Union inherited strong instruments for **preventing fragmented national industrial policy**, but historically possessed fewer instruments for conducting an explicitly European industrial strategy.

This tension becomes increasingly visible as industrial policy returns to the European agenda.

The Lisbon Strategy: from market integration to competitiveness

The Lisbon Strategy of 2000 marked an important shift in the direction of European economic policy. The European Council declared the objective of making the EU "the most competitive and dynamic knowledge-based economy in the world" by 2010. The strategy placed innovation, knowledge, research, human capital, information technologies and structural reform at the centre of the European economic agenda (European Council, 2000).

The Lisbon agenda did not represent a return to traditional sectoral industrial policy. Instead, it expanded the concept of competitiveness beyond the removal of market barriers. Productivity, innovation capacity and knowledge became increasingly understood as strategic sources of European economic performance.

This was particularly important because it introduced **capability construction** into the European policy vocabulary. Competitiveness could no longer be understood solely as the result of efficient markets. It increasingly depended upon research systems, human capital, technological capabilities and innovation ecosystems.

The Lisbon Strategy nevertheless remained constrained by its governance architecture. Its reliance on the Open Method of Coordination, national implementation and benchmarking reflected the continued predominance of a decentralised model of European economic governance. As Kok et al. (2004) subsequently argued, the strategy suffered from insufficient implementation and weak political ownership.

The Lisbon experience therefore revealed an enduring problem in EU industrial governance: **European institutions could identify strategic objectives more easily than they could mobilise the financial, institutional and political capacities necessary to implement them**.

Europe 2020: smart, sustainable and inclusive growth

The Europe 2020 Strategy, adopted in 2010, further broadened the competitiveness agenda. In the aftermath of the global financial crisis, the Commission framed European economic development around "smart, sustainable and inclusive growth" and established targets concerning employment, research and development, climate and energy, education and poverty reduction (European Commission, 2010).

Europe 2020 was significant for industrial policy because it increasingly connected competitiveness with environmental transformation and innovation. The relationship between industrial capacity and the green transition began to acquire greater institutional importance.

Yet the strategy remained primarily a framework for coordinating national reforms rather than a centralised European industrial programme. Its instruments were comparatively weak, and the post-crisis environment of fiscal constraint limited the scope for large-scale public investment.

Nevertheless, Europe 2020 contributed to the conceptual evolution from **competitiveness as market efficiency** towards **competitiveness as the capacity to innovate and transform**.

The distinction would become much more consequential after 2020.

The New Industrial Strategy of 2020: industrial policy becomes explicit

The European Commission's 2020 Industrial Strategy represented a more explicit recognition that European industrial capacity required coordinated policy intervention. The strategy identified industry as central to Europe's economic transformation and proposed measures to strengthen the Single Market, support industrial ecosystems, improve access to finance and accelerate the twin green and digital transitions (European Commission, 2020).

The significance of the strategy lies partly in its timing. It was adopted immediately before the COVID-19 pandemic fundamentally altered perceptions of supply-chain vulnerability. Consequently, the original strategy was rapidly supplemented by an updated industrial strategy in 2021, which placed greater emphasis on resilience, strategic dependencies and the need to monitor vulnerable ecosystems (European Commission, 2021).

The 2020–21 industrial strategy therefore represents an important transitional phase. Industrial policy was no longer primarily about ensuring the efficient functioning of European markets. It increasingly concerned the **capacity of European industry to undergo structural transformation while remaining resilient to external shocks**.

The analytical handles begin to converge at this point. **Direction** becomes more explicitly transformational; **capability** becomes a policy objective; and **dependency** begins to emerge as an object of European policy.

COVID-19 and the emergence of resilience

The COVID-19 pandemic accelerated this transformation dramatically.

The disruption of global supply chains exposed Europe's dependence on external suppliers for pharmaceuticals, medical equipment, semiconductors and other strategically important inputs. The central lesson was not simply that globalisation creates vulnerability, but that highly concentrated and geographically distant production networks can generate systemic risks when subjected to simultaneous shocks.

The Commission's 2021 industrial strategy update consequently introduced systematic analysis of strategic dependencies and vulnerabilities. The Strategic Dependencies and Capacities report identified areas in which the EU relied heavily on foreign suppliers and argued for policies designed to strengthen resilience, diversify supply and develop European capacities (European Commission, 2021).

This was a major conceptual shift.

Previously, dependence on international supply chains was largely treated as an efficiency issue. After COVID-19, some dependencies increasingly became understood as **strategic dependencies**.

The difference is crucial. A commercial dependency becomes strategically significant when disruption could threaten essential economic, technological or security objectives.

Resilience therefore became a new organising principle of industrial policy.

The objective was no longer simply:

How can European firms produce efficiently?

but increasingly:

How can Europe ensure that strategically important production continues under conditions of disruption?

This was the point at which the **dependency** and **reconfiguration** handles became central to EU industrial policy.

Versailles and the turn towards strategic autonomy

Russia's invasion of Ukraine in February 2022 accelerated the geopolitical transformation of European economic policy. The Versailles Declaration of March 2022 explicitly identified the need to reduce strategic dependencies, strengthen European resilience and develop greater strategic autonomy in critical sectors.

The political significance of Versailles lies in the way it connected economic capacity with geopolitical security. Strategic autonomy was no longer primarily a concept associated with defence or foreign policy. It increasingly encompassed energy, critical technologies, food security, industrial capacity and supply chains.

This development confirmed the growing convergence between industrial policy and economic security.

The EU's objective was not economic autarky. Rather, it was to ensure that critical dependencies did not leave the Union vulnerable to geopolitical coercion or systemic disruption.

This distinction is central to the analytical framework developed in this study. **Strategic autonomy is better understood as the capacity to govern interdependence than as the elimination of dependence.**

The Versailles moment therefore represents a transition from:

resilience as protection against disruption

towards:

strategic autonomy as the capacity to manage geopolitical dependence.

The Critical Raw Materials Act: governing strategic dependencies

The Critical Raw Materials Act (CRMA), adopted in 2024, represents one of the clearest institutional expressions of this transformation. The regulation establishes targets for increasing EU extraction, processing and recycling of strategic raw materials while simultaneously diversifying

external supply.

The Act explicitly recognises that the EU cannot simply eliminate external dependence. Instead, it seeks to combine domestic production with diversified international partnerships. The regulation establishes 2030 benchmarks for EU capacities in extraction, processing and recycling and sets a target that no more than 65% of the Union's annual consumption of each strategic raw material at a relevant processing stage should come from a single third country (Regulation (EU) 2024/1252).

This is a particularly important example of **dependency reconfiguration**.

The objective is not autarky. It is to change the structure of dependence by combining:

domestic capability + recycling + processing capacity + supplier diversification + international partnerships.

The CRMA therefore embodies the transition from industrial policy as competitiveness policy towards industrial policy as **strategic dependency governance**.

It also demonstrates why the seven analytical handles need to be considered together. The Act has a clear **direction**—economic security and industrial resilience; seeks to build **capability**—European extraction, processing and recycling; addresses **dependency**—supplier concentration; employs multiple **instruments**—targets, permitting, monitoring and partnerships; depends upon **connectivity**—the movement of raw materials through infrastructure; requires multilevel **governance**—EU institutions, Member States and external partners; and ultimately seeks **reconfiguration** of supply relationships.

The Net-Zero Industry Act: industrial policy becomes transformational

The Net-Zero Industry Act (NZIA), adopted in 2024, extended this logic into the green transition. The regulation seeks to strengthen European manufacturing capacity for key net-zero technologies, including solar technologies, batteries, heat pumps, electrolysers, biogas and biomethane technologies, grid technologies and carbon-management technologies (Regulation (EU) 2024/1735).

The significance of the NZIA is that decarbonisation is no longer treated solely as an environmental objective. It becomes an **industrial-development objective**.

The EU increasingly recognises that the green transition will generate new industrial dependencies and competitive pressures. If Europe decarbonises while importing the technologies required for decarbonisation, the transition may reduce one form of dependency while increasing another.

The NZIA therefore seeks to align climate objectives with European production capacity.

This marks a further development in the evolution of industrial policy:

Industrial policy is increasingly being used to shape the technological structure of the green transition itself.

This is precisely the logic anticipated by mission-oriented approaches, in which public policy seeks to shape technological trajectories rather than merely respond to market outcomes (Mazzucato, 2018).

The Economic Security Strategy: industrial policy becomes geoeconomic

The EU Economic Security Strategy of June 2023 further consolidated the geopolitical transformation of industrial policy. The strategy identifies four broad categories of risk: resilience of supply chains, security of critical infrastructure, technology security and leakage, and the weaponisation of economic dependencies or economic coercion (European Commission, 2023).

This represents an important conceptual development because the policy object is no longer simply **industrial competitiveness**.

The object becomes the security of the European economic system itself.

Industrial policy, trade policy, investment policy, technology policy and foreign economic policy increasingly overlap.

This convergence makes the traditional distinction between domestic and external industrial policy increasingly difficult to sustain. Industrial resilience requires international diversification; technological security requires control over cross-border investment and technology transfer; critical infrastructure requires international cooperation; and supply-chain security requires external partnerships.

The economic-security agenda therefore supplies the geopolitical dimension of **strategic interdependence**.

The Draghi Report: competitiveness becomes a strategic problem

Mario Draghi's *The Future of European Competitiveness*, published in September 2024, provided a major synthesis of these developments. The report argues that Europe faces a structural competitiveness challenge arising from the productivity gap with the United States, high energy costs, technological competition, the need to decarbonise and increasing geopolitical fragmentation (Draghi, 2024).

Draghi's analysis is important because it rejects the idea that European competitiveness can be restored through incremental regulatory reform alone. Instead, it identifies a need for large-scale investment in innovation, energy, infrastructure, defence and strategic technologies.

The report therefore brings together several strands that had previously developed separately:

competitiveness + productivity + decarbonisation + investment + security + strategic dependence.

It also identifies the scale problem at the heart of contemporary European industrial policy. European firms and governments face competition from economic systems capable of mobilising very large amounts of public and private capital, while EU-level investment remains constrained by fragmented capital markets and limited fiscal capacity.

Draghi therefore strengthens the **capability** dimension of EU industrial policy while simultaneously reinforcing its **strategic** and **geopolitical** dimensions.

The question is no longer simply whether Europe should intervene.

It is increasingly:

Can Europe mobilise sufficient collective capability to remain economically competitive and strategically autonomous?

The Competitiveness Compass: institutionalising the new direction

The Commission's Competitiveness Compass, presented in January 2025, translates many of these concerns into a new strategic framework. It identifies three principal imperatives: **closing the innovation gap, developing a joint roadmap for decarbonisation and competitiveness, and reducing excessive dependencies while increasing security** (European Commission, 2025).

This is significant because the Compass explicitly brings together objectives that had previously been institutionally separated.

Innovation corresponds to **capability**.

Decarbonisation corresponds to **direction and transformation**.

Reducing excessive dependencies corresponds to **strategic interdependence and reconfiguration**.

The Compass therefore represents a further institutionalisation of the trajectory identified throughout this chapter.

European industrial policy is no longer organised around competitiveness alone. Competitiveness itself is being reconceptualised as dependent upon technological capability, energy security, decarbonisation, resilience and the management of external dependencies.

The Clean Industrial Deal: towards integrated industrial transformation

The Clean Industrial Deal, launched by the Commission in February 2025, represents the most explicit synthesis of this evolution to date. It seeks to place decarbonisation and industrial competitiveness within a common policy framework, with particular emphasis on energy-intensive industries, clean technologies, investment, circularity and European manufacturing capacity (European Commission, 2025).

Its significance is conceptual as much as programmatic.

The Clean Industrial Deal rejects the implicit separation between environmental policy and industrial policy. Decarbonisation is presented simultaneously as a climate objective, an industrial opportunity and a competitiveness strategy. The Commission explicitly links affordable energy, clean manufacturing, investment, circularity, skills and European industrial capacity.

This represents the culmination of the historical trajectory traced in this chapter:

market integration → competitiveness → resilience → strategic security → industrial transformation.

The progression does not mean that the Single Market or competition policy has become irrelevant. On the contrary, the contemporary model remains deeply embedded in the EU's regulatory architecture. What has changed is the

direction in which that regulatory architecture is being deployed.

The EU increasingly uses regulation not only to correct market failures but to create markets for strategic technologies, direct investment, secure supply chains and shape technological trajectories. State aid is no longer treated exclusively as a potential distortion of competition but increasingly as an instrument for achieving European strategic objectives. Public finance is increasingly mobilised towards industrial transformation. Trade relationships are increasingly assessed in terms of resilience and economic security. Infrastructure is increasingly viewed as part of strategic supply-chain architecture.

The result is a qualitatively different conception of industrial policy.

From market integration to strategic interdependence

Taken together, these developments demonstrate that EU industrial policy has undergone a cumulative transformation rather than a sudden policy reversal.

The **Single Market** established the foundational logic of European market integration.

Competition policy provided the governance architecture through which national industrial intervention was disciplined and European market integration protected.

The **Lisbon Strategy** introduced a stronger concern with knowledge, innovation and competitiveness.

Europe 2020 broadened competitiveness towards smart, sustainable and inclusive growth.

The **2020 Industrial Strategy** made industrial transformation an explicit European policy objective.

COVID-19 transformed supply-chain vulnerability into a question of resilience and brought strategic dependencies onto the European policy agenda.

Versailles connected resilience to strategic autonomy and geopolitical security.

The **Critical Raw Materials Act** institutionalised dependency diversification and domestic capability-building.

The **Net-Zero Industry Act** connected decarbonisation with European manufacturing capacity.

The **Economic Security Strategy** explicitly linked industrial and technological dependencies to geopolitical risk.

The **Draghi Report** reframed competitiveness as a structural problem requiring large-scale European investment and capability construction.

The **Competitiveness Compass** consolidated innovation, decarbonisation and security as mutually reinforcing objectives.

The **Clean Industrial Deal** then brought these strands together around an explicitly integrated conception of industrial transformation.

The historical sequence therefore demonstrates a movement from an EU model principally concerned with **governing markets** towards one increasingly concerned with **shaping productive capabilities and governing the external relationships on which those capabilities depend**.

This is the point at which the historical analysis connects directly to the theoretical framework developed earlier.

The regulatory-state model remains embedded in the EU's institutional architecture, but it is increasingly complemented by transformational instruments. The transformational state, however, cannot build strategic capabilities through domestic intervention alone. European industrial capacity remains embedded in international production, resource and infrastructure networks. Consequently, industrial transformation increasingly requires the governance and reconfiguration of external interdependence.

The contemporary EU therefore occupies a position that cannot be adequately described either as a return to the traditional developmental state or as a continuation of the regulatory state unchanged.

It is better understood as an emerging **strategic interdependence state**.

Its objective is not autarky.

Its objective is not simply competitiveness.

Its objective is not even resilience in isolation.

Rather, it is the capacity to **build strategic capabilities while selecting, diversifying, securing and reconfiguring the external dependencies through which those capabilities are sustained**.

This provides the historical foundation for the empirical analysis that follows. The subsequent chapters can therefore ask not merely whether EU industrial policy has become more interventionist, but whether the new policy architecture is actually producing the **capabilities, dependencies, connectivity arrangements, governance structures and reconfigurations** predicted by the analytical framework.

The central historical finding is consequently that the evolution of EU industrial policy has involved a progressive expansion of the object of intervention:

from markets, to firms and competitiveness, to productive capabilities, to supply chains and resilience, and ultimately to the international economic relationships through which European strategic capabilities are reproduced.

The Clean Industrial Deal is particularly revealing in this respect because it explicitly treats **decarbonisation, competitiveness and resilience as interconnected rather than separate policy objectives** (European Commission, 2025). The significance of this convergence is that industrial policy is increasingly becoming the institutional space in which economic, technological, environmental and geopolitical objectives are integrated.

The transformation of EU industrial policy can therefore be captured as a movement:

from market integration, through competitiveness and resilience, towards strategic security and industrial transformation.

And it is precisely at this point that the analytical question shifts from **what Europe produces** to **what relationships Europe must construct and govern in order to produce it**.

That is the transition from the **regulatory state to strategic interdependence**.

Analytical Synthesis: From Competitiveness to Strategic Interdependence

The historical evolution of EU industrial policy demonstrates a cumulative transformation rather than a rupture. The EU has moved from **market integration, through competitiveness and resilience, towards strategic security and industrial transformation**. This trajectory provides the empirical basis for the analytical framework developed in this study: contemporary industrial policy increasingly concerns not only the construction of productive capabilities, but also the external relationships through which those capabilities are sustained.

The Single Market established the institutional foundations of the regulatory state, with European economic governance centred on market-making, competition and common rules (Majone, 1994, 1997). The Lisbon Strategy subsequently widened the policy objective towards innovation, productivity and knowledge-based competitiveness (European Council, 2000), while Europe 2020 connected competitiveness more explicitly to technological and environmental transformation (European Commission, 2010). These developments established the first analytical move: **from governing markets towards building capabilities**.

The 2020 Industrial Strategy made this capability-building objective more explicit, but COVID-19 exposed the vulnerability of European production to concentrated external supply chains (European Commission, 2020, 2021). The empirical significance of the pandemic was therefore not simply that supply chains were disrupted; it was that previously treated economic dependencies became recognised as **strategic dependencies**. This marks the point at which capability and dependency become analytically inseparable.

The Versailles Declaration subsequently connected these dependencies to strategic autonomy and geopolitical security (European Council, 2022). The Critical Raw Materials Act institutionalised the response by combining domestic extraction, processing and recycling with supplier diversification and international partnerships (Regulation [EU] 2024/1252). The Net-Zero Industry Act applied a similar logic to strategic technologies, linking decarbonisation to European manufacturing capability (Regulation [EU] 2024/1735). Empirically, these instruments demonstrate that the EU increasingly responds to vulnerability not through autarky, but through **reconfiguration**.

The Economic Security Strategy reinforced this shift by treating supply chains, technology, infrastructure and economic coercion as interconnected sources of strategic risk (European Commission, 2023). Draghi's report subsequently connected competitiveness to productivity, investment, energy costs, technological capacity and geopolitical fragmentation (Draghi, 2024). The Competitiveness Compass and Clean Industrial Deal consolidated these objectives by bringing innovation, decarbonisation, competitiveness, resilience and security into a more integrated policy framework (European Commission, 2025a, 2025b).

These empirical developments substantiate the framework's central proposition: **EU industrial policy**

has progressively expanded from the governance of markets to the governance of strategic interdependence.

The analytical sequence is therefore:

strategic objective → capability requirement → external dependency → vulnerability → policy intervention → reconfiguration → resilience.

This sequence provides a way of reading the historical evidence theoretically. The Single Market primarily addressed **direction** through market integration. Lisbon and Europe 2020 strengthened **capability** through innovation and productivity. COVID-19 brought **dependency** into the centre of policy. The CRMA and NZIA demonstrate increasingly targeted **instruments** for changing productive and supply structures. Economic-security policy extends this towards the **governance** of vulnerabilities, while infrastructure, diversification and international partnerships increasingly enable their **reconfiguration**.

The empirical record therefore reveals a limitation in existing accounts of the regulatory and transformational state. The regulatory-state literature explains how the EU constructed markets and governed competition (Majone, 1994, 1997). Transformational and mission-oriented approaches explain why the state increasingly seeks to shape productive and technological capabilities (Mazzucato, 2013, 2018). Strategic-autonomy and economic-security approaches explain the growing concern with vulnerability and geopolitical dependence. What remains less adequately theorised is the relationship between these processes.

The evidence suggests that **capability-building itself generates an external governance problem**. European batteries require minerals and processing; clean technologies require components and energy; digital industries require technologies and infrastructure; industrial resilience requires alternative logistics and suppliers. Consequently, building capability at home increasingly requires the construction and management of relationships abroad.

This produces the study's central theoretical proposition:

Strategic autonomy is not the elimination of interdependence, but the capacity to govern and reconfigure it.

The empirical evolution of EU policy supports this interpretation. The CRMA does not seek complete self-sufficiency; it combines European capacity with diversified external supply. The NZIA does not reject global markets; it seeks greater European productive capacity within them. The Economic Security Strategy does not advocate wholesale decoupling; it seeks to reduce excessive vulnerabilities (European Commission, 2023). The Clean Industrial Deal similarly combines European industrial capacity with openness to international investment and trade (European Commission, 2025b).

The historical evidence therefore points towards an emerging form of **strategic interdependence governance**. Its distinctive feature is the simultaneous pursuit of domestic capability and external reconfiguration. The EU seeks to strengthen what it can produce, diversify what it cannot, secure the infrastructure through which resources and goods move, and establish institutional relationships that make critical dependencies more manageable.

This provides the bridge from the historical analysis to the empirical chapters that follow. The relevant question is no longer simply whether EU industrial policy has become more interventionist. It is whether its instruments actually **alter the configuration of European capabilities and dependencies**.

The empirical analysis can consequently test four propositions. First, whether new industrial instruments generate measurable productive and technological capabilities. Second, whether they reduce excessive concentration in strategically important supply chains. Third, whether infrastructure, finance and international partnerships create credible alternatives to vulnerable dependencies. Fourth, whether these changes increase European strategic choice rather than merely redistribute existing dependencies.

The analytical contribution of the study therefore lies in moving from **industrial policy as domestic intervention** to **industrial policy as the governance and reconfiguration of interdependence**. This is the theoretical link connecting the historical evolution of EU policy to the empirical investigation that follows.

Table

Period / Initiative	Primary Objective	Key Policy Logic	Main Concern	Industrial Policy Character
Single Market (1986–1992)	Market integration	Create a larger European market	Fragmentation and protectionism	Industrial policy through market-

				making and competition
Competition Policy Era	Market discipline	Prevent distortions and state subsidies	National intervention	Industrial policy through regulation and state-aid control
Lisbon Strategy (2000)	Competitiveness	Innovation, productivity and knowledge	Productivity gap	Capability-building through research, skills and innovation
Europe 2020 (2010)	Smart, sustainable growth	Innovation linked to environmental goals	Post-crisis recovery	Competitiveness through transformation and sustainability
Industrial Strategy (2020)	Industrial transformation	Strengthen industrial ecosystems	Green and digital transition	Explicit European industrial policy
COVID-19 (2020–21)	Resilience	Secure critical supply chains	Strategic dependencies	Industrial policy as resilience-building
Versailles Declaration (2022)	Strategic autonomy	Reduce excessive dependencies	Geopolitical vulnerability	Industrial policy linked to economic security
Critical Raw Materials Act (2024)	Dependency diversification	Build domestic and external supply options	Supplier concentration	Strategic dependency governance
Net-Zero Industry Act (2024)	Green industrialisation	Align decarbonisation with manufacturing	Clean-tech dependence	Industrial policy as technological transformation
Economic Security Strategy (2023)	Economic security	Manage strategic vulnerabilities	Technology, infrastructure and coercion risks	Geoeconomic industrial policy
Draghi Report (2024)	Competitiveness renewal	Productivity, investment and scale	Global competitiveness gap	Capability-building at European scale
Competitiveness Compass (2025)	Integrated competitiveness	Innovation + decarbonisation + security	Fragmented policy objectives	Institutionalising the new industrial paradigm
Clean Industrial Deal (2025)	Industrial transformation	Decarbonisation as competitiveness strategy	Energy costs and industrial decline	Integrated industrial transformation

Key Take-aways

The key takeaway is that EU industrial policy has undergone a fundamental transformation in both its objectives and its **object of intervention**. What began primarily as a project centred on market regulation and the promotion of competition has progressively expanded towards strengthening European productive capabilities, addressing structural vulnerabilities, and managing strategic dependencies. This evolution reflects a broader redefinition of competitiveness itself: economic resilience, technological capacity, and the ability to secure critical inputs are now increasingly understood as integral to Europe's economic strength, alongside traditional concerns with market efficiency.

This transformation also means that industrial policy can no longer be understood as a purely internal economic policy. European productive and technological capabilities are embedded in global supply chains, external markets, technological ecosystems, and strategic partnerships. As a result, the EU has increasingly sought not only to

strengthen domestic capabilities but also to shape the international relationships on which those capabilities depend. The central shift is therefore from **governing markets to governing strategic interdependence**. EU industrial policy is now concerned not simply with how markets operate within Europe, but with how Europe can shape, manage, and strategically reconfigure the networks of interdependence that underpin its economic and technological power.

Summary

In summary, the evolution of EU industrial policy can be understood as a broader transformation in both **policy objectives and policymaking institutions**. What initially emerged as a relatively constrained policy approach, largely shaped by the logic of market integration, competition, and the removal of barriers to economic activity, has progressively developed into a more comprehensive and strategic form of economic governance. As the European economy has become increasingly exposed to technological competition, global supply-chain disruptions, geopolitical tensions, and dependencies on external markets and suppliers, the scope of what constitutes an industrial policy concern has expanded considerably. Industrial policy is no longer concerned only with ensuring that markets function efficiently; it increasingly seeks to shape the productive structures, technological capacities, and external relationships that determine Europe's economic resilience and strategic autonomy.

This transformation has been accompanied by a significant evolution in the **institutional capacity of the EU**. Industrial policy was not originally designed as a fully developed, centralised EU policy domain. Instead, relevant responsibilities were distributed across different policy areas and institutional actors, particularly competition policy, the internal market, trade, research and innovation, and regional development. Over time, however, industrial policy has become increasingly institutionalised and coordinated across these domains. The emergence of dedicated strategies, new governance mechanisms, cross-sectoral initiatives, and stronger coordination between the European Commission, Member States, and other European institutions reflects an attempt to develop a more coherent capacity to address industrial challenges at the European level.

Importantly, this institutional development has not simply involved the creation of new instruments. It has also involved a **reorientation of existing institutions and policy competences**. Competition policy, for example, has increasingly been considered alongside concerns about industrial competitiveness and global economic rivalry. Trade policy has become more closely connected to questions of supply-chain resilience and economic security, while research and innovation policy has increasingly been linked to the development and protection of strategic technologies. Industrial policy has consequently become more horizontal, cutting across traditional policy boundaries and requiring greater coordination between previously distinct areas of EU policymaking.

The changing institutional landscape also reflects a shift in the EU's understanding of the relationship between the **internal market and the global economy**. Earlier approaches largely treated openness and market integration as mutually reinforcing sources of European competitiveness. More recent approaches recognise that openness can also generate vulnerabilities when European firms and industries become excessively dependent on external suppliers, technologies, resources, or markets. The policy challenge has therefore shifted from simply maximising the benefits of interdependence towards determining **which forms of interdependence are desirable, which create unacceptable vulnerabilities, and how those relationships can be managed strategically**.

This marks an important change in the role of EU institutions. Rather than acting primarily as regulators of market conditions, EU institutions increasingly perform a strategic function: identifying critical sectors, anticipating vulnerabilities, coordinating investment, supporting emerging technologies, mobilising public and private resources, and shaping external economic relationships. In this sense, the institutionalisation of industrial policy reflects a broader transformation in the EU's capacity to act as an economic and geopolitical actor.

The evolution should therefore not be understood as a linear replacement of one policy paradigm by another. Earlier objectives—market integration, competition, efficiency, and openness—have not disappeared. Instead, they increasingly coexist and interact with newer objectives centred on resilience, security, technological leadership, and strategic autonomy. The result is a more complex policy framework in which different objectives can sometimes reinforce one another but can also generate tensions. For example, measures designed to protect strategic industries may conflict with traditional competition principles, while efforts to diversify supply chains may involve trade-offs with cost efficiency.

Ultimately, the evolution of EU industrial policy reflects a deeper transformation in the **purpose and capacity of European economic governance**. The EU has moved from a model in which industrial policy was largely

embedded within broader market-making and regulatory processes towards one in which institutions increasingly seek to shape the productive and geopolitical conditions under which European economic activity takes place. The institutional evolution therefore mirrors the transformation of the policy itself: from **governing markets, to building productive capabilities, to managing strategic dependencies, and ultimately to shaping strategic interdependence**.

6.From Competitiveness to Economic Security

The transformation of EU industrial policy is not only a transformation of instruments; it is also a transformation in the meaning of competitiveness itself. For much of the post-Maastricht period, European competitiveness was principally understood through the capacity of firms and economies to compete successfully within an increasingly integrated market, with productivity, innovation, cost efficiency and regulatory quality forming its principal foundations (Porter, 1990; Aiginger & Rodrik, 2020). The contemporary EU, however, increasingly confronts a world in which economic efficiency cannot be separated from resilience, technological capability, energy security and geopolitical vulnerability (European Commission, 2023; Farrell & Newman, 2019). This does not mean that productivity has ceased to matter; rather, productivity is increasingly understood as one component of a broader conception of economic security in which the capacity to withstand disruption and retain strategic choice has become an additional dimension of competitiveness (Draghi, 2024).

What does competitiveness mean?

Competitiveness has always been a contested concept because it can refer simultaneously to firms, sectors, national economies and regional economic systems. At the firm level, competitiveness concerns the ability to produce goods and services that can succeed in markets, while at the macroeconomic level it is associated with productivity, innovation, investment and the quality of institutions supporting economic activity (Porter, 1990). Krugman (1994) famously warned against treating national economies as if they were simply large firms competing against one another, arguing that productivity rather than an undefined notion of national competitiveness should remain the central concern. This caution remains important for the EU because competitiveness cannot simply mean defeating external competitors through lower costs or higher exports. At the same time, the contemporary geopolitical environment has exposed limitations in an exclusively productivity-centred conception of competitiveness, because an economy can be highly efficient while remaining dangerously dependent on concentrated external suppliers (European Commission, 2021). The contemporary EU therefore increasingly treats competitiveness as the capacity to combine productivity, innovation, investment, technological capability, energy affordability and resilience within an integrated economic system (European Commission, 2025a). The Competitiveness Compass reflects this broader understanding by placing innovation, decarbonisation and competitiveness alongside the reduction of excessive dependencies and the strengthening of security (European Commission, 2025a). Competitiveness has consequently become less a measure of market performance alone and more a question of strategic economic capability.

This conceptual expansion is important because the EU's competitiveness problem can no longer be separated from the structure of the international political economy. European firms operate within global production networks in which components, technologies, minerals, energy and investment are distributed across multiple jurisdictions (Gereffi, 2018). Globalisation increased efficiency partly by allowing firms to specialise geographically and optimise supply chains, but this specialisation also generated forms of concentration that can become vulnerabilities under conditions of geopolitical conflict or systemic disruption (Farrell & Newman, 2019). The challenge for European policy is therefore no longer simply to maximise efficiency within global markets but to determine which forms of interdependence remain economically beneficial and which create unacceptable strategic exposure (European Commission, 2023). This distinction is central to the transformation from competitiveness policy towards economic security.

Productivity versus resilience

The tension between productivity and resilience lies at the centre of this transformation. Traditional economic analysis tends to value specialisation because concentrating production in locations with comparative advantages can reduce costs and increase efficiency (Krugman, 1994). Global value-chain scholarship similarly demonstrated how firms could increase productivity by fragmenting production across countries and allocating different stages of production to locations with specialised capabilities (Gereffi, Humphrey, & Sturgeon, 2005). Yet the same fragmentation can generate vulnerabilities when a critical input is concentrated in a small number of suppliers or jurisdictions (Farrell & Newman, 2019). Resilience therefore introduces a second criterion of economic performance: an economic system should not only produce efficiently under normal conditions but

should also retain the capacity to absorb shocks and recover from disruption (Brunnermeier et al., 2020). The COVID-19 pandemic made this tension visible by demonstrating that highly efficient global supply chains could become fragile when transport, production and demand were simultaneously disrupted (European Commission, 2021). The lesson was not that globalisation had failed, but that efficiency and resilience are not automatically aligned objectives.

The policy implication is not that Europe should abandon global production networks. Complete localisation would often increase costs, reduce specialisation and weaken access to technologies and resources that cannot be efficiently reproduced within Europe (Pisani-Ferry, 2023). Instead, resilience requires identifying those dependencies where concentration creates disproportionate strategic risk and then developing mechanisms for diversification, substitution, stockpiling, recycling, domestic production or alternative supply routes (European Commission, 2021). This represents an important conceptual shift because resilience is fundamentally relational: an industry becomes resilient not simply because it produces more domestically, but because it has credible alternatives when one source of supply becomes unavailable. Strategic resilience therefore concerns the architecture of interdependence, rather than the volume of domestic production alone.

Strategic dependencies

The concept of strategic dependency emerged precisely from this recognition that not every external dependence is equally problematic. The European Commission's Strategic Dependencies and Capacities report identified strategic dependencies as relationships in which the EU relies heavily on foreign suppliers for products or technologies that are considered strategically important and difficult to substitute (European Commission, 2021). This distinction allows policymakers to move beyond the misleading objective of reducing all imports and instead concentrate on dependencies whose disruption could materially affect European economic or strategic interests. The concept also provides an important bridge between industrial policy and economic security because the vulnerability of a supply chain depends not only on whether Europe imports a product but also on the availability of substitutes, supplier concentration, technological barriers and the geopolitical reliability of the relevant jurisdictions (European Commission, 2021).

Strategic dependency is therefore best understood as a relational condition rather than a fixed geographical fact. A dependence becomes more strategically significant when alternative suppliers are scarce, switching costs are high, infrastructure is concentrated, technological substitution is difficult or the supplier possesses political leverage over the dependent actor (Farrell & Newman, 2019). This perspective also reveals why dependence cannot be assessed solely through trade volumes. A relatively small imported component can become strategically critical if its absence halts an entire production system (European Commission, 2021). Conversely, large import volumes may present relatively little strategic risk where numerous suppliers exist and switching costs remain low. Strategic dependency therefore requires an analysis of concentration, substitutability, technological specificity, infrastructure and political leverage.

Economic security

The concept of economic security captures the broader institutionalisation of these concerns within EU policy. The European Economic Security Strategy adopted in 2023 identifies four broad areas of risk: resilience of supply chains, security of critical infrastructure, technology security and technology leakage, and the use of economic dependencies as instruments of coercion (European Commission, 2023). This formulation is significant because it explicitly connects economic openness with questions of strategic vulnerability. The objective is not to close the European economy but to preserve the benefits of openness while ensuring that openness does not become a source of coercive vulnerability (European Commission, 2023). Economic security consequently sits between traditional economic policy and national security policy, creating a hybrid policy field in which trade, investment, technology, infrastructure and industrial capacity acquire geopolitical significance.

This development reflects a broader transformation in international political economy. Farrell and Newman (2019) argue that states can exploit asymmetric interdependence by using their structural positions within global networks to generate coercive leverage, a phenomenon they describe through the concept of weaponised interdependence. The implication for Europe is profound because the EU's openness and centrality within global markets create both economic opportunities and potential vulnerabilities (Farrell & Newman, 2019). Economic security policy therefore seeks to preserve interdependence while reducing the possibility that strategically important networks can be weaponised against the Union. The central policy problem becomes one of governing openness rather than abandoning it.

Critical technologies

Critical technologies represent one of the clearest areas in which industrial policy and economic security have converged. Technologies such as semiconductors, artificial intelligence, quantum technologies, advanced telecommunications and biotechnology possess economic significance because they generate productivity and innovation, but they also possess strategic significance because they underpin military capabilities, digital infrastructure and future industrial systems (European Commission, 2021). The European Chips Act illustrates this convergence by seeking to strengthen Europe's semiconductor ecosystem, increase production capacity, support technological development and reduce vulnerability to disruptions in global semiconductor supply chains (European Commission, 2022). The Act therefore cannot be interpreted solely as a competitiveness measure because its rationale also concerns technological sovereignty and resilience.

The strategic importance of critical technologies arises partly from their systemic character. A technology becomes strategically important when it enables multiple sectors simultaneously, meaning that disruption can propagate across an entire economic system (European Commission, 2021). Semiconductors, for example, are inputs into automobiles, telecommunications, medical equipment, defence systems and consumer electronics, which means that a disruption in semiconductor supply can generate effects far beyond the semiconductor industry itself (European Commission, 2022). Industrial policy consequently increasingly targets technological ecosystems rather than isolated sectors. This marks a movement from sectoral competitiveness towards capability-based economic security.

Critical raw materials

Critical raw materials provide an even clearer demonstration of the relationship between industrial capability and external dependency. Modern European industries require a range of minerals for batteries, renewable-energy technologies, electronics, aerospace, defence and digital infrastructure, while many stages of extraction and processing remain concentrated outside the EU (European Commission, 2023a). The Critical Raw Materials Act therefore seeks simultaneously to increase European extraction, processing and recycling while diversifying external supply (Regulation [EU] 2024/1252). The underlying policy logic is revealing because it does not seek complete resource autarky. Instead, it combines domestic capability with international diversification.

The CRMA consequently embodies a sophisticated understanding of strategic autonomy. Its diversification targets reflect the recognition that a resilient economy requires multiple sources of supply rather than the elimination of imports (Regulation [EU] 2024/1252). Recycling and circularity further extend this logic by reducing the need for virgin material inputs and increasing the effective supply of resources available within Europe (European Commission, 2023a). The policy objective is therefore best understood as reconfiguring the structure of dependence. Europe seeks greater control over strategically important stages of value chains while continuing to participate in global resource markets.

Energy security

Energy security has become another central dimension of the transformation from competitiveness towards economic security. Europe's dependence on Russian fossil fuels demonstrated that low-cost energy imports can generate substantial strategic vulnerabilities when the supplier possesses geopolitical leverage (European Commission, 2022a). Russia's invasion of Ukraine therefore transformed energy policy from an issue primarily associated with affordability and decarbonisation into one simultaneously concerned with sovereignty, resilience and geopolitical security.

The REPowerEU programme represented the European response by seeking to reduce dependence on Russian fossil fuels, accelerate renewable deployment, diversify energy supplies and improve energy efficiency (European Commission, 2022a). The policy demonstrated that energy security cannot be separated from industrial competitiveness because energy prices directly affect the production costs of energy-intensive European industries. At the same time, the transition towards renewable energy introduces new dependencies involving critical minerals, technologies, manufacturing capacity and electricity infrastructure (European Commission, 2023a). Energy security therefore illustrates the recursive character of strategic interdependence: reducing one dependency can generate another.

This observation is crucial for the analytical framework developed here. Strategic autonomy cannot be evaluated at the level of individual commodities or technologies alone because interventions can shift dependencies across the value chain. A transition away from fossil fuels may reduce dependence on one set of suppliers while increasing dependence on mineral processing, battery technologies, grid infrastructure or renewable-energy manufacturing elsewhere (International Energy Agency [IEA], 2022). Economic security therefore requires a systemic analysis of how dependencies interact.

Supply-chain resilience

Supply-chain resilience has consequently become one of the central concepts of contemporary EU industrial policy. Resilience refers not simply to the absence of disruption but to the capacity of a production system to absorb, adapt to and recover from shocks (Brunnermeier et al., 2020). The EU's post-pandemic industrial strategy increasingly treats resilience as a property of entire industrial ecosystems rather than individual firms (European Commission, 2021). This has encouraged greater attention to supplier diversification, strategic stocks, domestic production, recycling, alternative logistics routes and monitoring of vulnerabilities.

The resilience agenda also changes the temporal logic of industrial policy. Traditional competitiveness policy tends to evaluate efficiency under normal market conditions, whereas resilience policy evaluates how an economic system performs under stress. This means that apparently inefficient redundancy can acquire strategic value because maintaining alternative suppliers or production capacity may provide insurance against future disruption (Brunnermeier et al., 2020). The economic value of resilience therefore cannot always be captured through short-term price comparisons.

This does not imply that all redundancy is beneficial. Excessive duplication can reduce productivity and impose substantial costs. The policy challenge is therefore to determine where redundancy has strategic value and where market concentration remains economically efficient without creating unacceptable vulnerability. The emerging EU approach to economic security can be understood as an attempt to institutionalise this distinction.

Friend-shoring

The concept of friend-shoring emerged internationally as governments began to reconsider the geographical distribution of strategic supply chains. Treasury Secretary Janet Yellen (2022) defined friend-shoring as the diversification of supply chains towards countries regarded as trusted or reliable partners. The concept reflects the recognition that geopolitical alignment can become economically relevant when supply-chain disruption creates strategic vulnerabilities.

For the EU, however, friend-shoring presents both opportunities and limitations. Diversifying supply towards politically reliable partners can reduce exposure to coercion, but political alignment does not automatically guarantee economic resilience. A supposedly reliable partner may lack the infrastructure, technological capabilities, investment environment or production scale necessary to provide a genuine alternative supplier (European Commission, 2023). Friend-shoring must therefore be distinguished from effective diversification.

The analytical implication is that political trust is only one component of strategic interdependence. A resilient external relationship requires a combination of political reliability, productive capacity, infrastructure, finance, technological compatibility and logistical connectivity. Friend-shoring is therefore best understood not as a geographical relocation of production but as an attempt to construct politically manageable economic networks.

De-risking

The EU has consequently preferred the language of de-risking to that of comprehensive decoupling. The distinction became particularly explicit in European discussions of relations with China, where the objective has been framed as reducing excessive dependencies while preserving mutually beneficial economic relations (European Commission, 2023). De-risking acknowledges that interdependence can generate value as well as vulnerability and that complete separation would impose substantial economic costs.

The concept is therefore highly compatible with the framework developed here. De-risking seeks to modify the structure of interdependence without eliminating interdependence itself. This may involve diversification, domestic capability-building, technological safeguards, investment screening, export controls or strategic partnerships, depending upon the type of vulnerability involved (European Commission, 2023).

Yet de-risking also raises a difficult analytical problem. How much risk is acceptable, and who determines which dependencies have become excessive? The answer cannot be derived from economics alone because the assessment of “risk” depends upon political judgments concerning security, technological sovereignty and geopolitical uncertainty. De-risking is consequently not simply an economic optimisation strategy; it is a form of political prioritisation of dependencies.

Open strategic autonomy

The EU's concept of open strategic autonomy attempts to resolve the apparent contradiction between autonomy and interdependence. Rather than seeking self-sufficiency, open strategic autonomy combines the capacity to act independently with continued participation in international markets and institutions (European Commission, 2021). The concept therefore represents an

attempt to reconcile the economic benefits of openness with the strategic requirement for greater resilience.

This is particularly important because the EU's economic model is structurally dependent on international trade, foreign investment, imported energy and globally distributed technologies. Autarky would therefore be neither realistic nor necessarily beneficial. Strategic autonomy must instead be understood as the capacity to retain strategic choice under conditions of interdependence.

This interpretation also corresponds to the EU's broader approach to economic security. The Economic Security Strategy does not call for economic isolation; it explicitly seeks to preserve the benefits of openness while protecting against critical vulnerabilities (European Commission, 2023). The resulting policy model is therefore neither traditional liberalisation nor traditional protectionism. It is an attempt to construct managed openness.

The limits of autonomy

The concept of strategic autonomy nevertheless contains important contradictions. First, the EU cannot realistically eliminate all external dependencies because its economy is embedded in globally distributed production systems (Pisani-Ferry, 2023). Second, attempts to internalise production may increase costs and reduce productivity if applied indiscriminately. Third, diversification itself can generate new dependencies because alternative suppliers may occupy different positions within the same global value chain (Gereffi, 2018). Fourth, policies designed to secure one strategic technology may create vulnerabilities elsewhere if they shift demand towards alternative but equally concentrated inputs.

There is therefore a fundamental distinction between autonomy as independence and autonomy as strategic capacity. Independence implies the ability to operate without external relationships; strategic capacity implies the ability to maintain meaningful choices despite external relationships. For the EU, the second formulation is both more realistic and more analytically productive.

This leads to the critical proposition of this study:

The EU cannot become strategically autonomous by eliminating interdependence; it can become strategically autonomous only by managing interdependence.

The proposition follows directly from the preceding discussion. European competitiveness depends upon global markets; European green transformation depends upon international resources and technologies; European technological capability depends upon globally distributed knowledge and production systems; and European energy security depends upon diversified external relationships as well as domestic capacity (European Commission, 2023; IEA, 2022). The objective cannot therefore be to withdraw from interdependence but to ensure that interdependence remains diversified, governable, substitutable and politically manageable.

This formulation also clarifies the relationship between resilience and autonomy. Resilience is not synonymous with self-sufficiency because a resilient system may remain heavily interconnected internationally. What matters is whether disruption at one point in the network can be absorbed through substitution, diversification or adaptation (Brunnermeier et al., 2020). Strategic autonomy therefore represents the political capacity to ensure that such alternatives exist.

The same logic applies to economic security. Economic security does not require the elimination of economic openness; it requires the identification and governance of those dependencies that could generate unacceptable strategic vulnerability (European Commission, 2023). The objective is therefore not to reduce interdependence as such but to differentiate between beneficial interdependence and strategically dangerous dependence.

This distinction provides the bridge to the theory developed in the next section.

The evolution from competitiveness towards economic security demonstrates that contemporary EU industrial policy increasingly operates through a different conception of the relationship between domestic capability and external dependence. Competitiveness identifies the capacity to perform effectively in markets; resilience adds the capacity to withstand disruption; economic security adds the capacity to protect strategic interests; and strategic autonomy adds the capacity to preserve political choice under conditions of interdependence (European Commission, 2023; Draghi, 2024).

The analytical implication is that the relevant unit of analysis is no longer simply the European firm or industry. It is the strategic industrial ecosystem, encompassing firms, technologies, resources, infrastructures, finance, institutions, suppliers and geopolitical relationships. This is why critical technologies, raw materials, energy, logistics and supply chains increasingly appear within the same policy architecture. They are components of the same underlying problem: the ability of the EU to construct and sustain strategic capabilities within an

interdependent global economy.

The movement from competitiveness to economic security can therefore be represented as a conceptual progression:

Productivity → competitiveness → resilience → economic security → strategic autonomy

Yet this progression should not be understood as replacing one objective with another. Productivity remains necessary for competitiveness; competitiveness remains necessary for prosperity; resilience protects productive capacity against disruption; economic security identifies politically consequential vulnerabilities; and strategic autonomy concerns the capacity to retain meaningful choices within these interdependent structures.

The distinctive theoretical move of this study is therefore to treat interdependence itself as the object of industrial-policy governance.

The EU's contemporary industrial strategy does not simply seek to determine what Europe should produce. It increasingly seeks to determine where critical production should occur, which external dependencies are acceptable, which suppliers are sufficiently reliable, which technologies require domestic capability, which infrastructures provide strategic alternatives, and which international relationships can support European resilience (European Commission, 2023, 2025a).

This transforms the meaning of industrial policy.

Industrial policy becomes not merely a policy for firms and sectors, but a policy for configuring the economic networks through which strategic capabilities are produced.

Economic security therefore becomes the external dimension of industrial capability.

Strategic autonomy becomes the capacity to govern that external dimension.

And interdependence becomes not merely a condition of the global economy, but an object of deliberate policy.

The central proposition that emerges is consequently stronger than the conventional claim that the EU is moving towards strategic autonomy:

The contemporary EU is attempting to construct strategic autonomy through the selective reconfiguration of interdependence rather than through its elimination.

This proposition provides the theoretical bridge to the next chapter. It suggests that the decisive question is no longer whether the EU is becoming more interventionist, but how it selects, prioritises, governs and reconfigures the external dependencies embedded within the industrial capabilities it seeks to build.

In this sense, the transformation from competitiveness to economic security is ultimately a transformation in the object of European economic governance. The EU has moved from asking how European markets can become more competitive towards asking how European productive capabilities can remain competitive, resilient and strategically governable in an increasingly fragmented global political economy (Draghi, 2024; European Commission, 2025a).

The theoretical consequence is that strategic autonomy should be conceptualised not as independence from the world economy, but as capacity within the world economy.

That distinction is the foundation of the theory of strategic interdependence developed in the following chapter.

The underlying analytical dimensions are:

strategic objectives → capabilities → dependencies → vulnerabilities → instruments → connectivity → reconfiguration → resilience/autonomy

But these should appear as the logic of the argument, not as a labelled checklist.

I would therefore rewrite the conclusion like this:

Analytical Conclusions: From Competitiveness to the Governance of Strategic Interdependence

The evolution of EU industrial policy from competitiveness towards economic security reveals a deeper transformation in what European economic governance seeks to achieve. Competitiveness was historically concerned primarily with productivity, innovation, investment and the capacity of European firms to perform successfully within an integrated market (Krugman, 1994; Aiginger & Rodrik, 2020). The emergence of resilience and economic security has not displaced these objectives, but has altered the conditions under which they are understood. Productivity remains essential to competitiveness, yet productivity alone cannot guarantee economic security when strategically important production depends upon concentrated external suppliers, vulnerable infrastructure or technologies controlled beyond European jurisdiction (European

Commission, 2021, 2023; Draghi, 2024).

The central analytical implication is that European industrial capability must now be understood in relation to the external structures upon which it depends. The question is no longer simply whether Europe possesses productive capacity in a particular sector, but whether that capacity can be sustained when access to critical resources, technologies, energy, components or infrastructure is disrupted. Industrial capability is therefore inherently relational. A European battery industry, semiconductor ecosystem or clean-technology sector is embedded within networks extending across multiple jurisdictions, and the resilience of those industries depends partly upon the stability, diversity and governability of those networks (Gereffi, 2018).

This changes the meaning of dependency. External dependence is not in itself a weakness. International specialisation can increase efficiency, reduce costs and provide access to resources and technologies that Europe could not efficiently reproduce domestically (Krugman, 1994; Gereffi, 2018). Dependence becomes strategically problematic when it is highly concentrated, difficult to substitute, technologically specific or vulnerable to political disruption (European Commission, 2021). The relevant distinction is therefore not between dependence and independence, but between manageable interdependence and strategically vulnerable dependence.

This distinction is fundamental to the emerging EU conception of economic security. The European Economic Security Strategy identifies supply-chain resilience, critical infrastructure, technology security and economic coercion as interconnected areas of risk (European Commission, 2023). These concerns demonstrate that economic security is increasingly concerned with the conditions under which European capabilities can be maintained rather than merely with the volume of European production. A domestic industry may remain vulnerable if its essential inputs are controlled elsewhere, while an internationally integrated industry may be relatively resilient if it possesses multiple suppliers, alternative technologies and diversified logistical routes.

The consequence is that contemporary industrial policy increasingly seeks to alter the configuration of dependence. The Critical Raw Materials Act illustrates this logic particularly clearly. Its objective is not to eliminate European imports of minerals but to combine greater European extraction, processing and recycling with diversification of external supply (Regulation [EU] 2024/1252). The Chips Act follows a similar logic in the technological sphere by strengthening European semiconductor capabilities while recognising that semiconductor production will remain embedded in global technological ecosystems (European Commission, 2022). The emerging policy model is consequently neither autarkic nor traditionally liberal. It seeks to retain the benefits of international economic integration while reducing forms of dependence that could undermine strategic capacity.

This is where the concept of strategic autonomy acquires a more precise meaning. Strategic autonomy cannot realistically mean independence from external economic relationships because the European economy is structurally embedded in global production, trade, technology and financial networks (Pisani-Ferry, 2023). Nor can it mean simply increasing domestic production. Domestic production may itself depend upon imported raw materials, foreign technologies, external energy or international logistics. Strategic autonomy is therefore better understood as the capacity to retain meaningful strategic choices despite external interdependence.

The pursuit of autonomy consequently requires diversification. Where a strategic capability depends upon a single supplier, technology, route or jurisdiction, the EU can seek to create alternatives through domestic production, additional suppliers, recycling, technological substitution, stockpiling, infrastructure investment or international partnerships (European Commission, 2021, 2023). Diversification thus becomes a mechanism through which dependence can be transformed into resilience. It is not the disappearance of external relationships that produces autonomy, but the availability of credible alternatives within those relationships.

This also explains the growing significance of infrastructure within EU industrial strategy. Industrial production cannot be separated from the networks through which resources, energy, components, data and finished products move. Transport corridors, ports, electricity grids, digital infrastructure and logistics systems therefore influence the resilience of industrial ecosystems as directly as factories and research facilities do. Infrastructure becomes strategically significant when it determines whether an industrial system possesses alternative routes, suppliers and markets. Connectivity is consequently not simply a matter of trade facilitation; it can become part of the material architecture of industrial resilience.

The same reasoning changes how strategic partnerships should be interpreted. A partnership has limited industrial significance if it remains primarily diplomatic or declaratory. Its strategic significance increases when it connects European demand and investment with external

productive capabilities, infrastructure, finance, technology and markets. Strategic partnerships can therefore function as mechanisms through which the EU reorganises the external conditions of its industrial production. Foreign economic policy and industrial policy begin to overlap because external relationships become part of the infrastructure through which industrial objectives are pursued.

This convergence also explains why the contemporary EU policy mix increasingly combines instruments that were previously analysed separately. Industrial subsidies, regulation, trade policy, investment screening, technology controls, development finance, infrastructure investment and economic diplomacy increasingly operate within a common strategic environment (European Commission, 2023). Their significance cannot therefore be assessed exclusively at the level of individual instruments. What matters is whether their combined effect changes the conditions under which strategically important capabilities are produced and reproduced.

The analytical framework developed in this study consequently moves from industrial objectives to capability formation, from capability formation to dependency, from dependency to vulnerability, and from vulnerability to the reconfiguration of interdependence. The purpose is not simply to determine whether the EU has become more interventionist. It is to identify how intervention changes the external economic relationships supporting European industrial capacity.

This provides a different way of evaluating industrial policy. A policy should not be considered successful merely because it increases domestic production. Its strategic significance depends upon whether it strengthens the wider system on which that production depends. An increase in European battery manufacturing, for example, may contribute to industrial capability while leaving strategic vulnerability largely unchanged if mineral processing, specialised components or energy inputs remain highly concentrated elsewhere. Conversely, diversification of suppliers or transport routes may substantially improve resilience even where domestic production increases only modestly. Capability and resilience are therefore related but distinct outcomes.

This distinction allows the study to move beyond the conventional opposition between globalisation and protectionism. The EU is not necessarily attempting to withdraw from global markets. Rather, it is attempting to determine which forms of interdependence remain economically advantageous, which have become strategically risky and how the latter can be modified without destroying the benefits of the former (European Commission, 2023). De-risking is therefore better understood as a process of selective restructuring than as a preliminary stage of complete decoupling.

The theoretical proposition that follows is consequently straightforward:

Strategic autonomy is not the elimination of interdependence; it is the capacity to govern, diversify and reconfigure interdependence.

This proposition provides the bridge between the literature on competitiveness, resilience and economic security and the theory of strategic interdependence advanced in this study. Competitiveness explains why productive capability matters. Resilience explains why the continuity of that capability matters under conditions of disruption. Economic security explains why certain dependencies acquire political significance. Strategic autonomy explains why the EU seeks to preserve the capacity to act despite those dependencies. Strategic interdependence brings these dimensions together by treating the structure of external economic relationships itself as an object of industrial policy.

The resulting conception of EU industrial policy is therefore considerably broader than the traditional concern with firms, sectors and markets. It encompasses the resources, technologies, infrastructure, finance, institutions and international relationships required to sustain strategic capabilities. Industrial policy becomes, in this sense, a form of strategic economic governance.

The transformation can therefore be expressed conceptually without treating these stages as discrete policy eras. The regulatory state sought primarily to govern the conditions under which markets operated (Majone, 1994). The transformational state increasingly seeks to shape markets and construct productive capabilities (Mazzucato, 2013, 2018). The emerging model goes further by seeking to govern the external relationships through which those capabilities are supplied, connected and reproduced.

The theoretical progression is therefore:

regulating markets → building capabilities → governing interdependence.

This is the central analytical contribution of the study.

It means that the external dimension of EU industrial policy should not be treated as an additional foreign-policy

component attached to an otherwise domestic industrial strategy. It is increasingly constitutive of industrial strategy itself. European productive capacity depends upon external resources, technologies, infrastructure, energy and markets, while the EU increasingly uses industrial, financial, trade and diplomatic instruments to shape those relationships (European Commission, 2023; Draghi, 2024).

The central research problem therefore becomes one of explaining how the EU attempts to construct resilient industrial capabilities by reconfiguring the external interdependencies on which those capabilities depend.

This formulation also establishes the empirical logic for the chapters that follow. Each major industrial-policy intervention can be examined by asking what strategic capability it seeks to establish, what external relationships that capability requires, where vulnerabilities arise within those relationships, which combination of policy instruments is mobilised in response, and whether those interventions ultimately produce a more diversified and governable configuration of interdependence.

The significance of this approach is that it allows apparently separate developments in EU policy to be understood as elements of a single transformation. Critical raw-material policy, semiconductor policy, clean-technology policy, energy diversification, infrastructure investment, investment screening and economic diplomacy increasingly converge around the same underlying problem: how can Europe retain strategic capabilities in an economy that remains fundamentally interdependent?

The answer proposed here is not autarky.

It is managed strategic interdependence.

The EU's emerging industrial-policy model can therefore be understood as an attempt to combine domestic capability-building with the deliberate construction of external alternatives. Strategic autonomy is achieved not when Europe ceases to depend upon the outside world, but when it possesses sufficient capabilities, relationships and alternatives to prevent any single external dependency from determining its strategic choices.

This is what distinguishes the emerging model from both the traditional regulatory state and conventional protectionism. The objective is neither simply to regulate markets nor to close them. It is to shape the configuration of markets, production networks and external economic relationships so that European strategic capabilities remain viable under conditions of geopolitical uncertainty.

The transformation from competitiveness to economic security therefore provides the conceptual foundation for the broader theory advanced in this thesis. The critical shift is from viewing interdependence as an external condition that industrial policy must accommodate to viewing interdependence as a policy object that industrial strategy can actively shape.

That shift is the foundation of the concept of Strategic Interdependence Industrial Policy developed in the next chapter.

6.Domains of Internal EU Industrial Policy: Beyond Market Integration

EU industrial policy cannot be reduced to the completion of the Single Market or the removal of barriers to cross-border economic activity. Those functions remain foundational, but they describe only the market-making layer of European industrial policy. The contemporary policy architecture reaches considerably further into the organisation of production, technological development, investment, finance, skills, infrastructure, energy, procurement and the coordination of national industrial interventions. This broader conception is consistent with the classic understanding of industrial policy associated with Johnson (1982), Chang (2002), Rodrik (2004) and Aiginger and Rodrik (2020), for whom industrial policy concerns the deliberate shaping of productive structures rather than simply the correction of conventional market failures. It is also consistent with Mazzucato's (2013, 2018) argument that states can actively shape markets and technological trajectories rather than merely regulate markets once they exist.

The analytical implication is important for the EU. Because the Union does not possess the fiscal and governmental capacities of a conventional nation-state, its industrial policy is necessarily distributed across multiple policy domains and levels of governance. Article 173 TFEU provides the explicit Treaty basis for industrial policy, but contemporary EU industrial policy is also constructed through competition and State aid law, research and innovation programmes, cohesion policy, energy and climate regulation, public procurement, financial instruments, trade-defence instruments, strategic legislation and the EU budget. Recent scholarship therefore increasingly describes EU industrial policy as a fragmented or hybrid policy system rather than a single coherent programme (Dermine, 2026; Hornkohl & Pelekis, 2026

The first domain beyond market integration is productive

capability formation. Industrial policy becomes substantive when the objective shifts from allowing firms to compete towards determining whether firms and production systems possess the capabilities necessary to compete. This includes technological know-how, production scale, organisational capacity, specialised suppliers and the ability to move innovations from research into commercial production. The developmental-state literature has long emphasised that productive capabilities cannot necessarily be generated spontaneously through markets because learning, coordination and investment often involve uncertainty and positive spillovers (Johnson, 1982; Chang, 2002). Mazzucato (2013, 2018) similarly argues that public institutions can play a formative role in creating markets and directing investment towards activities characterised by high uncertainty and long time horizons.

In the EU context, capability formation is pursued through instruments such as the European Innovation Council, Horizon Europe, the European Chips Act, the Net-Zero Industry Act and Important Projects of Common European Interest (IPCEIs). IPCEIs are particularly revealing because they allow several Member States to coordinate support for technologically demanding projects that generate cross-border spillovers. The Commission explicitly describes them as instruments for bringing together knowledge, expertise, financial resources and economic actors across Member States in order to create European ecosystems.The empirical significance is that EU industrial policy is increasingly concerned not merely with whether markets function efficiently, but with which capabilities Europe possesses and whether those capabilities can be scaled.

A second domain is research, innovation and technological development. Industrial competitiveness depends not only on existing productive capacity but on the capacity to generate and diffuse new technologies. This is the terrain in which the insights of Schumpeter (1942), Freeman (1987), Lundvall (1992) and Nelson (1993) remain particularly relevant. Their work shifts attention from individual firms towards systems of innovation involving universities, firms, research institutions, finance and public agencies. EU industrial policy increasingly reflects this systemic understanding through Horizon Europe, technology partnerships, research infrastructures, innovation ecosystems and strategic technology initiatives.

The EU's contemporary approach is therefore concerned with the entire movement from knowledge creation to technological deployment and industrial scale-up. The European Chips Act, for example, is not simply an attempt to subsidise semiconductor production. It seeks to strengthen research, technological capacity, manufacturing and ecosystem development simultaneously. Industrial policy thus increasingly operates across the innovation chain rather than at a single point of production.

A third domain is industrial finance and investment mobilisation. Productive transformation requires capital, yet strategic technologies frequently involve high fixed costs, long investment horizons and uncertain returns. These characteristics create precisely the conditions under which private investment may be insufficient or excessively risk-averse. Rodrik (2004) emphasises the importance of public coordination where uncertainty prevents markets from revealing which productive activities will become viable, while Mazzucato (2013) stresses the state's role in absorbing risks associated with technological development.

Within the EU, this function is complicated by the absence of a fully centralised fiscal state. Industrial investment is therefore financed through a combination of the EU budget, European Investment Bank instruments, Member State expenditure, private capital and approved State aid. This creates an inherently multilevel financial structure. The EU establishes strategic priorities and regulatory frameworks, while Member States often provide a substantial share of the actual fiscal support. The result is not centralised industrial policy but coordinated investment governance.

This creates a fourth domain: State aid and fiscal coordination. State aid is particularly important because it sits at the intersection between competition policy and industrial strategy. Historically, State aid control was designed principally to prevent Member States from distorting competition and fragmenting the Single Market. Increasingly, however, the Commission has used State aid compatibility to steer national expenditure towards European priorities. Hornkohl and Pelekis (2026) argue that State aid control has increasingly acquired a coordinating function within EU industrial policy, particularly through the General Block Exemption Regulation, IPCEIs and the Clean Industrial Deal State Aid Framework. (OUP Academic)

This produces a distinctive EU configuration. The Union does not simply tell Member States what industrial policy to pursue, nor does it fully centralise industrial spending. Instead, it increasingly coordinates national intervention through European rules. State aid compatibility becomes a mechanism through which national fiscal capacity is partially aligned with European industrial objectives. The result is a form of industrial governance that is simultaneously supranational and national.

This coordination function is especially visible in IPCEIs. Their requirement for participation by multiple Member States means that industrial intervention is constructed as a European project rather than as isolated national subsidy programmes. Since 2018, the Commission has approved multiple integrated IPCEIs involving substantial public and private investment, with the projects designed to generate cross-border spillovers and European industrial ecosystems. (Competition Policy)

A fifth domain is skills and human capital. Industrial transformation cannot be achieved through capital investment and regulation alone. New production systems require engineers, technicians, researchers, digital specialists and workers capable of operating increasingly complex technologies. This connects contemporary industrial policy to the broader developmental literature on human capital and structural transformation. It also demonstrates why industrial policy extends beyond manufacturing narrowly defined. Education, vocational training, labour-market institutions and lifelong learning can all become components of an industrial strategy when the objective is to construct capabilities in strategically important sectors.

The sixth domain is energy and industrial infrastructure. Energy prices and reliability directly affect industrial competitiveness, particularly in energy-intensive sectors such as chemicals, metals, cement and fertilisers. The green transition therefore transforms energy policy into an industrial-policy question. The EU's industrial strategy increasingly links renewable energy, electricity grids, hydrogen, energy efficiency and industrial decarbonisation because the cost and availability of energy condition the viability of European production (European Commission, 2025).

Infrastructure similarly has an industrial function. Digital networks, electricity grids, ports, railways, logistics systems and industrial clusters determine whether firms can access inputs, move products and achieve economies of scale. This extends industrial policy beyond the firm towards the production system in which firms are embedded.

A seventh domain is public procurement and lead-market creation. Industrial policy does not only operate through subsidies. Governments can influence technological development by becoming important customers for emerging technologies. Edler and Georghiou (2007) argue that public procurement can support innovation by creating demand for technologies that private markets have not yet scaled. This logic is increasingly relevant to European clean technologies, digital systems, defence technologies and infrastructure.

Procurement therefore represents a potentially powerful but underappreciated industrial-policy instrument because it addresses the demand side of industrial development. Subsidies can help firms develop a product; public procurement can create the market in which that product becomes commercially viable.

An eighth domain is regulatory market-shaping. Regulation should not be understood only as a constraint upon industry. As Mazzucato (2018) and Rodrik (2004) emphasise in different ways, public authorities can shape markets through standards, incentives and rules that alter the direction of private investment. The EU's regulatory capacity is particularly significant in this respect because its market size allows European rules to influence corporate behaviour well beyond individual Member States.

Environmental standards, emissions regulation, digital rules, product standards, circular-economy requirements and carbon pricing can therefore operate as industrial-policy instruments when they alter investment incentives and create markets for new technologies. The European regulatory state consequently remains central to the contemporary industrial strategy, but its regulatory capacity is increasingly being used to shape technological and productive transformation, rather than simply to remove barriers.

A ninth domain is industrial ecosystems and clusters. Contemporary industrial production increasingly depends upon dense networks of firms, suppliers, research institutions, infrastructure providers and specialised labour markets. Porter (1990) emphasised the importance of clusters for productivity and innovation, while more recent evolutionary approaches stress the importance of regional industrial capabilities and path dependence. EU industrial policy increasingly recognises this through ecosystem approaches that seek to coordinate firms, public authorities, research organisations and financial institutions around particular industrial transformations.

This is particularly important for understanding the relationship between EU and Member State policy. Industrial capabilities are geographically uneven. Some Member States possess strong automotive, chemical, pharmaceutical, semiconductor or engineering ecosystems, while others possess different capabilities. A uniform European industrial policy may therefore produce different effects across national economies. Coordination must consequently reconcile European strategic priorities with territorially differentiated productive structures.

A tenth domain is industrial restructuring and transition management. Industrial policy increasingly concerns not only the creation of new sectors but the transformation of existing ones. Decarbonisation requires restructuring carbon-intensive industries; digitalisation changes production processes; automation alters labour requirements; and technological disruption can make established production systems obsolete. Industrial policy therefore involves managing processes of structural change rather than simply supporting successful sectors.

This connects contemporary European policy to the evolutionary political economy of industrial transformation. As Cimoli, Dosi and Stiglitz (2009) argue, development is shaped by technological learning, institutional structures and the direction of structural change. Industrial policy consequently has a temporal dimension: governments must determine not merely which industries are competitive today, but which capabilities need to exist tomorrow.

These domains reveal why EU industrial policy should be understood as a policy system rather than a single policy. Its components include capability formation, research and innovation, finance, State aid, skills, energy, infrastructure, procurement, regulation, clusters and structural transformation. Each addresses a different constraint on productive development, but their effectiveness depends upon their interaction.

The EU's distinctive institutional challenge is that these domains are distributed across different levels of authority. The Commission controls important regulatory and competition instruments; the Council and Parliament shape legislation and strategic frameworks; Member States control much of the fiscal and industrial-policy apparatus; regions implement cohesion and cluster policies; and European financial institutions mobilise investment. Industrial policy is consequently produced through coordination rather than hierarchy.

This explains why the EU's industrial-policy model differs from the classic developmental state described by Johnson (1982). The European Commission cannot simply command firms or direct national investment. Nor can the Union fully replace Member State industrial policy. Instead, European institutions seek to coordinate incentives, resources and rules across multiple levels. This resembles what Di Carlo and Schmitz (2023) describe as a developmental network state, in which productive transformation depends upon networks connecting public institutions, firms and other actors rather than on centralised state direction.

The resulting governance problem is therefore as important as the individual policy instruments. Recent scholarship points to the fragmentation of EU industrial policy across different legal bases, institutions and procedures, with internal-market policy, State aid, cohesion policy and EU spending operating according to different decision-making structures (Dermine, 2026). (Wiley Online Library) The challenge is consequently not merely to identify more industrial-policy instruments, but to ensure that instruments operating at different levels reinforce rather than undermine one another.

This provides an important analytical distinction between policy capacity and coordination capacity. A Member State may possess substantial financial resources but lack access to complementary European capabilities. Conversely, the EU may establish ambitious strategic objectives but lack sufficient central fiscal capacity to implement them. Industrial transformation therefore depends upon the alignment of European priorities, national resources and private-sector capabilities.

The emerging EU model can consequently be characterised as multilevel industrial governance. The Union supplies common rules, strategic direction, market scale, regulatory power and selected financing mechanisms. Member States provide substantial fiscal resources, sectoral expertise and implementation capacity. Firms provide investment and technological knowledge. Regions provide specialised ecosystems and infrastructure. European financial institutions reduce investment risks. The effectiveness of industrial policy depends upon how these capacities are combined.

The central analytical conclusion is therefore that EU industrial policy extends well beyond market integration because the problem facing European industry is no longer simply the existence of barriers to exchange. It is the capacity to generate innovation, finance investment, develop skills, create infrastructure, scale technologies, restructure industries and coordinate national interventions around common European objectives.

This also clarifies the theoretical contribution of the study. The traditional regulatory-state perspective explains how Europe governs markets; developmental and mission-oriented approaches explain how states can build productive capabilities; and the emerging literature on strategic industrial policy explains why these capabilities have acquired greater geopolitical significance (Majone, 1997; Mazzucato, 2018; Rodrik, 2004). The EU case requires bringing these insights together because capability-building is dispersed across a multilevel governance system.

The key empirical question is therefore not simply whether the EU has an industrial policy. It is how these domains are coordinated across the Union and Member States, and whether their interaction produces capabilities that individual interventions could not generate independently.

This provides the bridge to the analytical framework developed in the thesis: EU industrial policy can be examined as a system that seeks to shape productive capabilities, mobilise investment, coordinate actors and instruments, and transform industrial structures. Its distinctive characteristic is that these functions are performed neither exclusively at the EU level nor exclusively by Member States, but through an evolving architecture of European coordination, national implementation and private-sector response.

The critical question, therefore, is whether this architecture produces genuine European industrial capacity or merely a collection of nationally differentiated interventions operating under a common regulatory umbrella. That tension between European coordination and national industrial sovereignty is one of the defining analytical problems of contemporary EU industrial policy.

ANALYTICAL CONCLUSIONS

The analysis leads to a conclusion that is more demanding than the claim that the EU has "returned" to industrial policy. The transformation is better understood as a change in the object of European economic governance. The EU increasingly seeks not simply to make markets function, but to shape the productive capabilities, technological trajectories, investment structures and strategic dependencies that determine whether European industry can remain competitive under conditions of geopolitical and technological uncertainty.

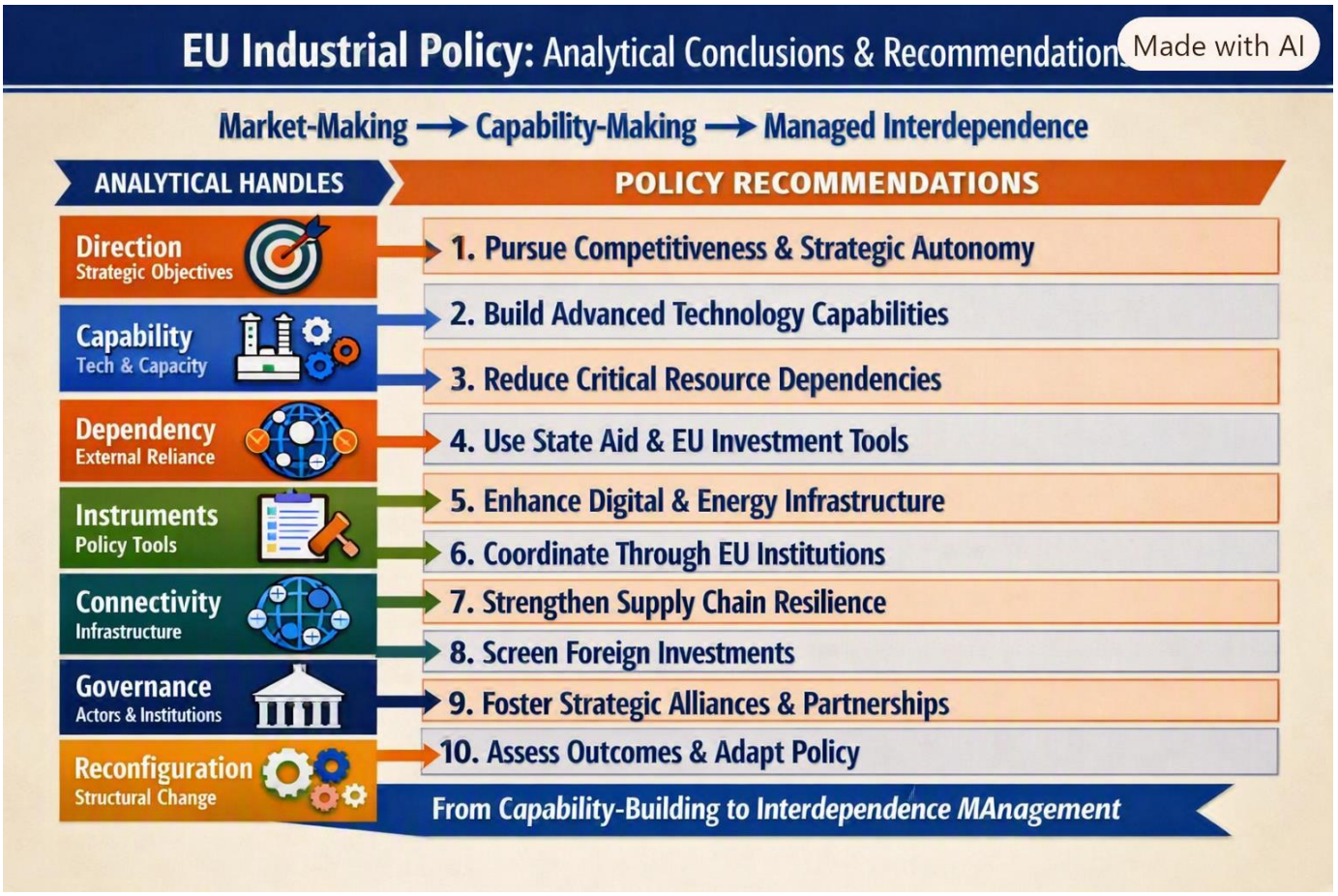
The historical analysis suggests that the EU has moved from market-making towards capability-making. The Single Market remains indispensable, but market integration alone cannot generate semiconductor capacity, affordable clean energy, advanced manufacturing, critical technologies, skilled labour or resilient supply chains. The Competitiveness Compass itself now places innovation, decarbonisation and security at the centre of the EU's competitiveness strategy, while treating finance, skills, simplification, the Single Market and EU–national coordination as enabling conditions. (European Commission)

This confirms the central analytical proposition developed in the thesis: industrial policy should be analysed through the interaction of direction, capability, dependency, instruments, connectivity, governance and reconfiguration. These are not separate policy categories. They describe the causal architecture through which industrial policy operates.

Direction concerns what the EU is attempting to change. The evidence indicates a decisive broadening of direction: from efficiency and competitiveness towards technological leadership, decarbonisation, resilience and economic security. The Clean Industrial Deal is particularly significant because it explicitly brings competitiveness and decarbonisation into a common industrial strategy and links them to energy costs, clean manufacturing, circularity and resilience. (European Commission)

Capability concerns what the EU must be able to produce, develop or control in order to achieve those objectives. Here the analytical finding is that European industrial policy increasingly targets capabilities rather than individual firms. Semiconductor fabrication, clean-tech manufacturing, electricity infrastructure, AI deployment, advanced materials and industrial decarbonisation are treated as strategic capabilities. This is consistent with the developmental and mission-oriented literature, which emphasises that productive capabilities emerge through cumulative investment, learning, coordination and institutional support rather than through market competition alone (Johnson, 1982; Mazzucato, 2013, 2018; Rodrik, 2004).

Table



Dependency provides the critical bridge between internal industrial policy and the wider political economy. European capabilities remain embedded in international networks of technology, energy, raw materials, finance and production. The policy response is therefore increasingly directed towards identifying and managing dependencies rather than assuming that market access automatically produces resilience. The Competitiveness Compass explicitly identifies reducing excessive dependencies and increasing security as one of its three transformational imperatives. (European Commission)

This produces the most important theoretical conclusion of the analysis: strategic autonomy cannot mean the elimination of interdependence. Europe is too deeply integrated into global production to pursue comprehensive self-sufficiency without imposing enormous economic costs. Strategic autonomy is therefore better conceptualised as the capacity to choose, diversify, absorb and reconfigure interdependence.

This interpretation also changes how resilience should be understood. Resilience is not simply maintaining inventories or bringing production back inside Europe. It is the ability to ensure that strategically important capabilities remain available when particular suppliers, technologies, routes or markets become disrupted. The objective is consequently not maximum localisation but strategically intelligent diversification.

The fourth analytical conclusion concerns instruments. The EU's emerging industrial policy is neither purely regulatory nor conventionally interventionist. It combines regulation, State aid, public finance, procurement, innovation funding, standards, trade instruments, investment screening and strategic partnerships. The Clean Industrial Deal State Aid Framework adopted in June 2025 illustrates this hybridisation by enabling Member States to support clean energy, industrial decarbonisation and clean-technology manufacturing within a common European framework. (Competition Policy)

This creates both an opportunity and a danger. The opportunity is that the EU possesses a much broader industrial-policy toolkit than the traditional regulatory-state model would suggest. The danger is policy fragmentation. If individual instruments pursue different objectives, industrial policy may become a collection of subsidies and regulations rather than a coherent capability-building strategy.

The fifth conclusion therefore concerns governance. The EU's distinctive industrial-policy problem is not simply insufficient intervention; it is insufficient coordination between different levels of intervention. Member States

retain substantial fiscal and industrial-policy capacity, while the EU controls competition rules, the Single Market, major regulatory instruments and important elements of European financing. The emerging model is therefore one of multilevel industrial governance, rather than a centralised European developmental state.

This is why the Commission's emerging Competitiveness Coordination Tool is potentially important. The Commission explicitly envisages stronger coordination of strategic industrial value chains across countries, indicating recognition that European industrial capabilities cannot always be constructed effectively through nationally fragmented intervention. (European Commission)

The analytical problem is therefore no longer simply whether Member States should receive greater freedom to subsidise industry. It is whether national fiscal capacity can be converted into European productive capability without fragmenting the Single Market.

That leads to the first major recommendation.

Build a European capability framework rather than a collection of sectoral strategies

The EU should establish a systematic framework identifying the capabilities that are strategically important to European economic security and long-term competitiveness. Rather than treating chips, batteries, AI, hydrogen, critical materials, defence, clean technologies and advanced manufacturing as separate policy silos, the Commission should map the technological and productive capabilities that connect them.

The relevant question should be:

What capabilities must Europe possess, at what scale, and within which time horizon, to remain economically resilient?

This would allow industrial policy to move from an accumulation of initiatives towards a genuine European capability strategy.

The second recommendation follows directly from the governance problem.

Make EU–Member State coordination the central mechanism of industrial policy

The EU should develop a clearer division of labour between European and national industrial intervention. European funding and coordination should concentrate on capabilities where scale, cross-border spillovers or strategic interdependence make fragmented national action inefficient. Member States should retain greater discretion where industrial advantages are predominantly national or regional.

This would avoid two opposite errors: excessive centralisation, which may ignore national productive specialisation, and uncontrolled national subsidy competition, which risks concentrating investment in the wealthiest Member States.

The objective should be European coordination without European uniformity.

The third recommendation concerns State aid.

Tie State aid more systematically to European additionality

The relaxation of State aid rules should not simply increase the volume of national subsidies. It should increase the European value of national intervention. State aid should receive stronger preferential treatment where it generates cross-border technological spillovers, strengthens European supply chains, develops shared infrastructure, creates interoperable capabilities or contributes to strategically important European value chains.

The relevant test should therefore move beyond:

Does this subsidy benefit a Member State?

towards:

What European capability does this subsidy create that could not be created as effectively through nationally fragmented intervention?

This would help reconcile industrial policy with the integrity of the Single Market.

The fourth recommendation concerns financing.

Create a stronger European industrial-finance architecture

The Draghi diagnosis points to the scale of Europe's investment problem, while the Clean Industrial Deal already seeks to mobilise more than €100 billion for EU-made clean manufacturing. (European Commission) The next step should be to institutionalise a more durable European mechanism for financing strategic capabilities rather than relying heavily on temporary programmes and national fiscal capacity.

European financing should prioritise projects that are commercially promising but structurally difficult to finance because of high upfront costs, technological uncertainty or long payback periods. This is particularly important for demonstration and scale-up, where Europe has often been stronger in research than in commercialisation.

The fifth recommendation concerns the relationship between innovation and industrial scale.

Close the European scale-up gap

European industrial policy should place greater emphasis on the transition from research → demonstration → commercialisation → scale. Europe possesses substantial research capacity, but the economic value of innovation depends on whether firms can scale technologies into globally competitive production systems.

This requires stronger links between Horizon Europe, the European Innovation Council, InvestEU, the EIB, procurement and industrial-policy instruments. Innovation policy should therefore be evaluated not only by patents, publications or research expenditure but by whether it generates productive capacity and internationally competitive firms.

The sixth recommendation concerns demand.

Use public procurement as an industrial-policy instrument

The EU should use its enormous public procurement market more strategically to create lead markets for European clean and strategic technologies. The Commission is already moving in this direction: the Clean Industrial Deal envisages European and low-carbon preferences in strategic procurement and public support schemes. (European Commission)

The objective should not be indiscriminate protectionism. Rather, procurement criteria should reward demonstrable contributions to European technological capability, resilience, sustainability and innovation.

This would strengthen the demand side of European industrial policy and help firms move from technological demonstration to commercial scale.

The seventh recommendation concerns energy.

Treat affordable energy as core industrial infrastructure

The Clean Industrial Deal correctly identifies energy costs as a central competitiveness constraint and links industrial policy to electrification, clean-energy deployment and stronger interconnections.

The EU should therefore treat electricity grids, interconnectors, storage, renewable generation and industrial electrification as strategic industrial infrastructure. Decarbonisation policy that raises industrial energy costs without simultaneously providing competitive clean energy risks accelerating deindustrialisation rather than industrial transformation.

The relevant objective should be decarbonisation at competitive energy costs.

The eighth recommendation concerns circularity.

Move from securing supply to reducing structural dependency

Critical-material policy should not focus exclusively on finding additional suppliers. The deeper strategy should combine diversification with substitution, recycling, material efficiency, circular design and technological innovation. The Clean Industrial Deal already identifies circularity as a means of reducing dependence on external suppliers and making better use of Europe's limited resources.

This would transform raw-material policy from a narrow security-of-supply strategy into a broader resource-productivity strategy.

The ninth recommendation concerns measurement.

Create an EU Industrial Capability and Resilience Scoreboard

The EU should evaluate industrial policy through outcomes rather than expenditure or legislative activity. A common scoreboard could track changes in productive capacity, technological capability, investment mobilisation, supplier concentration, energy costs, innovation diffusion, scale-up, skills, infrastructure and recovery capacity after disruption.

This would provide an empirical basis for determining whether industrial policy is actually producing the strategic capabilities it claims to support.

The tenth recommendation follows from the central theoretical argument of this study.

Define strategic autonomy as managed interdependence

The EU should avoid framing strategic autonomy as self-sufficiency. Such a conception would be economically unrealistic and potentially counterproductive. Instead,

European policy should distinguish between benign interdependence, manageable dependence and strategic vulnerability.

The policy objective should be to ensure that no strategically important capability depends excessively upon a single supplier, technology, jurisdiction or infrastructure route.

This produces a more sophisticated hierarchy of policy responses:

retain interdependence where it produces efficiency; diversify where concentration creates vulnerability; develop domestic capability where strategic capacity is indispensable; and build alternative relationships where geopolitical coercion is plausible.

This is the most important recommendation generated by the analytical framework.

The EU should consequently move from a binary distinction between autonomy and dependence towards a spectrum of managed interdependence.

The final recommendation concerns policy coherence.

Establish an integrated industrial-policy governance cycle

The EU should systematically connect strategic objectives, capability requirements, dependency mapping, instrument selection and outcome evaluation. Every major industrial initiative should answer five questions: what capability is being pursued; why is it strategically important; what dependencies constrain it; which combination of EU and national instruments can address those constraints; and how will success be measured?

This would effectively institutionalise the analytical framework developed in this thesis within the policy process itself.

The overall conclusion is therefore that the EU does not require simply more industrial policy. It requires more coherent industrial policy.

The emerging architecture already contains many of the necessary components. The Competitiveness Compass identifies innovation, decarbonisation and security as core priorities, while the Clean Industrial Deal attempts to align industrial competitiveness, energy, clean technologies, circularity, finance and resilience. (European Commission) The challenge is to transform these parallel initiatives into a coherent capability-building system.

The theoretical contribution of the analysis is that EU industrial policy is best understood as a movement from market governance towards strategic capability governance. The regulatory state has not disappeared; it has been repurposed. The EU continues to regulate markets, but increasingly uses regulation, finance, State aid, procurement and coordination to shape what those markets produce and which capabilities they sustain.

The policy implication is equally clear. European strategic autonomy will not be achieved by retreating from interdependence. It will be achieved by acquiring sufficient capabilities and institutional capacity to govern interdependence on more favourable terms.

That is the central analytical conclusion: the future of EU industrial policy lies neither in laissez-faire market integration nor in national economic autarky, but in European coordination of strategic capabilities within a system of managed interdependence.

8. The institutional views on EU Industry Policy

The European Commission's current approach to industrial policy is essentially to make European industry more competitive, innovative, productive and resilient while completing the transition to a low-carbon economy.

The Commission has moved away from seeing industrial policy mainly as a question of sectoral subsidies. Its current framework is the Competitiveness Compass, launched in January 2025 and strongly influenced by the Draghi report. It identifies three main challenges: closing the innovation gap, combining decarbonisation with competitiveness, and strengthening economic security and resilience.

Competitiveness and productivity

The Commission sees Europe's main problem as a productivity and investment gap compared with the US and other major economies. It wants European companies to innovate faster, adopt AI and digital technologies, scale up and invest more.

This means making it easier for companies to operate across the Single Market, reducing administrative burdens, improving access to finance and creating conditions in which innovative companies can grow from start-ups into large European businesses.

Energy and industrial competitiveness

The Commission increasingly sees energy costs as an

industrial competitiveness issue. Its Clean Industrial Deal therefore aims to accelerate renewable energy, electrification and energy efficiency while strengthening the European energy market and infrastructure.

The objective is to make clean energy more abundant, reliable and affordable, particularly for energy-intensive industries such as steel, metals and chemicals. The Commission explicitly links decarbonisation with industrial competitiveness rather than treating them as separate objectives.

Industrial investment

The Commission wants considerably more investment in clean technologies, grids, infrastructure, R&D, digital technologies and industrial production.

Public money is intended to help mobilise private capital. The Clean Industrial Deal, for example, is designed to mobilise more than €100 billion for EU-made clean manufacturing through state-aid flexibility, EU funding and other financial instruments. [2]

Innovation

Innovation is at the heart of the Commission's industrial strategy. It wants Europe to be better at taking research and turning it into commercial products, companies and factories.

The Competitiveness Compass therefore focuses on AI, advanced materials, quantum technologies, biotechnology, robotics and other strategic technologies. It also aims to improve conditions for start-ups and scale-ups.

The Commission's concern is essentially that Europe is good at research and invention, but less successful at commercialisation and industrial scale.

Strategic autonomy and resilience

The Commission also wants Europe to reduce excessive dependence on external suppliers for critical raw materials, energy, clean technologies and strategic products.

However, this does not mean closing Europe to the world. The Commission continues to support trade and foreign investment, while becoming more selective about strategic dependencies. It is developing Clean Trade and Investment Partnerships and strengthening economic-security tools.

More recently, the proposed Industrial Accelerator Act introduced conditions for certain very large foreign investments in strategic sectors. The Commission wants these investments to bring tangible benefits to Europe through jobs, innovation, technology transfer and local economic value.

The Single Market

Another major part of the Commission's industrial policy is simply to make the European market work better.

A company should be able to produce, invest and expand across Europe without facing unnecessary national barriers. The Commission therefore sees completion of the Single Market as an industrial-policy tool because a larger integrated market allows European companies to achieve scale.

Regulation

The Commission is also responding to industry's concerns about regulation. It has committed to reducing administrative burdens and reporting requirements and is introducing simplification measures designed to make it easier and faster for companies to invest and operate.

The philosophy is not simply deregulation. It is more accurately simplification: maintaining European standards while reducing unnecessary complexity, duplication and uncertainty.

The Commission's overall model

The Commission's industrial policy can therefore be understood as:

Affordable clean energy → investment → innovation → digitalisation and AI → higher productivity → larger European companies → stronger industrial capacity → global competitiveness.

And alongside this:

Single Market + skills + capital + infrastructure + trade + economic security → resilience and scale.

The important change is that industrial policy, climate policy and competitiveness policy are increasingly being treated as one agenda.

[2] https://ert.eu/wp-content/uploads/2024/03/ERT-Competitiveness-and-Industry-Benchmarking-Report-2024.pdf

The Commission's message is essentially:

Europe should decarbonise in a way that makes European industry stronger, not weaker.

That is the logic behind the Clean Industrial Deal: use the energy transition to lower costs, stimulate investment, create new clean industries and modernise existing ones, while protecting Europe's industrial base from unfair global competition.

In comparison with the positions we discussed earlier, ERT pushes hardest on scale, investment and global competitiveness; ETUC adds jobs, wages and worker participation; the Commission is trying to build a framework that combines competitiveness, decarbonisation, innovation, resilience and social objectives.

The European Parliament

The European Parliament's position on EU industrial policy is increasingly focused on one central objective: Europe must remain an industrial power while carrying out the green and digital transitions. Parliament sees competitiveness, decarbonisation and strategic autonomy as interconnected rather than separate policies.

Parliament's recent position is particularly clear in its June 2025 resolution on the Clean Industrial Deal. It argues that Europe needs a strong and sustainable industrial base, capable of creating high-quality jobs while reducing emissions and strengthening resilience. Parliament welcomed the Clean Industrial Deal as a step towards stronger industrial competitiveness, innovation, strategic autonomy, decarbonisation and clean growth.

A major concern is energy cost and availability. Parliament considers affordable clean energy essential for industrial competitiveness. It supports faster deployment of renewables, electrification, stronger electricity grids and measures to reduce energy-price volatility. For energy-intensive industries such as steel, chemicals, cement, glass and paper, the availability of competitive energy is seen as fundamental to keeping production in Europe.

Parliament also wants much greater investment in European industry. It supports instruments such as the Industrial Decarbonisation Bank and the mobilisation of more than €100 billion for clean manufacturing. The aim is to make decarbonisation economically viable and to encourage companies to invest in modern production facilities in Europe.

Innovation and technology are another central pillar. Parliament wants Europe to strengthen its clean-technology manufacturing base and create markets for European technologies. It supports public procurement and other measures that create demand for European-made clean, circular and low-carbon products.

Parliament also places considerable emphasis on simplification and faster permitting. Its view is that European companies, particularly smaller firms, should not face unnecessary administrative burdens when investing in new factories, technologies or clean-energy projects. Faster approvals and simpler funding procedures are seen as important tools for accelerating investment and innovation.

There is also a strong trade and strategic-autonomy dimension. Parliament wants Europe to remain open to international trade but believes European industry must be protected against unfair competition, dumping and excessive foreign industrial overcapacity. It supports instruments such as CBAM and trade-defence measures where necessary to maintain a level playing field.

For Parliament, industrial policy is therefore also about jobs and skills. The transition should strengthen Europe's industrial base and create high-quality employment rather than result in the relocation of production and emissions outside Europe. Parliament supports investment in skills and training alongside industrial transformation.

The Parliament's overall approach can be expressed simply:

Affordable clean energy + investment + innovation + stronger European manufacturing + faster permitting + skills + fair international competition = industrial competitiveness.

What is particularly significant is that Parliament does not see decarbonisation and industrial competitiveness as inherently opposed. Its preferred approach is to make the green transition an industrial opportunity: use renewable energy, electrification, clean technologies and innovation to modernise European industry, increase productivity and create new industrial capacity.

In short, Parliament's message is:

Europe should decarbonise without deindustrialising.

That is the key idea connecting its positions on industrial policy, energy, innovation, competitiveness and strategic autonomy.

The Council

The Council of the EU and the European Council have become increasingly focused on industrial competitiveness. Their position is broadly supportive of the Commission's direction, but the Council places particular emphasis on implementation, national competitiveness, energy costs, the Single Market and reducing regulatory burdens.

The Council's formal conclusions on industrial policy call for a long-term EU industrial strategy extending to 2030 and beyond, with clear objectives, indicators and an action plan. Ministers stress that European industry needs stronger competitiveness, growth and innovation, while also becoming more sustainable and resilient.

The European Council, representing EU heads of state and government, has made competitiveness a political priority. In March 2025, leaders called for a "step change" in EU action to boost competitiveness, strengthen the Single Market, promote quality jobs and deliver the green and digital transitions.

The Council's approach can be understood around several connected ideas.

Competitiveness and productivity are at the centre. The Council wants Europe to close its innovation gap with the US and other major economies, increase investment and make it easier for companies to grow and operate across the Single Market. It sees the Single Market itself as one of Europe's most important competitive assets.

Industrial capacity and scale are increasingly important. The European Council has explicitly called for strengthening the EU's industrial base and promoting European technological leadership. (Consilium) More recent Council discussions around the Industrial Accelerator Act focus on using the Single Market and public procurement to strengthen European industrial production, with the objective of raising industry's contribution to EU GDP to 20% by 2035.

Energy costs are a major concern. The Council sees affordable, secure and clean energy as essential to industrial competitiveness. The logic is that Europe cannot maintain energy-intensive production if electricity and gas remain structurally more expensive than for major competitors. This connects industrial policy directly to the expansion of renewables, electrification, grids and energy infrastructure.

Decarbonisation should support competitiveness rather than undermine it. The Council broadly supports the Clean Industrial Deal approach of turning the green transition into an industrial opportunity. It has also endorsed the use of tax incentives to support clean technologies and industry.

Innovation is another central pillar. The Council wants Europe to close its innovation gap, strengthen technological leadership and help innovative companies scale. Its work on start-ups and scale-ups stresses the need for an ecosystem that can turn European research and innovation into successful companies while maintaining economic security and an open economy.

Regulatory simplification is particularly important to the Council. European leaders have repeatedly called for a substantial reduction in administrative burdens and faster implementation of competitiveness measures. The October 2025 European Council conclusions called for a "step change" in action on simplification, the competitive green transition and digital sovereignty.

There is also a stronger emphasis on economic security and strategic dependencies. The Council wants Europe to remain open to international trade and investment, but it also wants greater resilience in critical supply chains, raw materials, energy and strategic technologies. This is increasingly linked to the idea of strengthening European industrial capacity without closing the EU economy.

The Council's position on public investment is therefore broadly that Europe needs significantly more investment in infrastructure, energy, innovation and strategic technologies, while avoiding fragmentation between Member States. European-level financing and coordination are important because national fiscal capacities differ considerably.

Taken together, the Council's message is:

Europe needs to produce more, innovate more and invest more in Europe, while reducing energy costs and regulatory barriers.

The industrial strategy is therefore moving towards:

lower energy costs + stronger Single Market + more investment + innovation + European industrial capacity + simpler regulation + economic security = greater competitiveness.

There is also an important political evolution. The Council is increasingly moving from the language of simply "managing the green transition" towards "using the transition to strengthen European industry." That is why industrial policy, energy policy, competitiveness and strategic autonomy are now being treated as closely connected issues.

European Roundtable of Industrialist – Market shares are down, earnings up

ERT's central argument is that EU competition policy should become more supportive of European industrial competitiveness. This does not mean weakening competition rules. Rather, ERT argues that competition policy should take greater account of the global competitive environment in which European companies operate, including the importance of scale, innovation, investment, resilience and competition from companies outside the EU.

Industrial policy

ERT is concerned that Europe has strong individual companies but does not always create the conditions for them to achieve sufficient scale to compete globally. Its *Competing at Scale* work argues that competition policy should take a broader view of market power and consider the position of European companies relative to global competitors. This is particularly relevant in strategic sectors such as clean technologies, semiconductors, defence, digital technologies and advanced manufacturing.

ERT therefore sees industrial policy and competition policy as complementary. Industrial policy should strengthen Europe's strategic industrial capabilities, while competition policy should preserve competitive markets and the integrity of the Single Market.

Competition policy

ERT's main criticism is that competition assessments can be too focused on current market structures and short-term effects. It argues for a more dynamic and forward-looking approach.

In particular, authorities should consider how a transaction or business practice affects Europe's ability to innovate, invest, achieve scale, improve productivity and compete internationally over the longer term. ERT has made this argument particularly strongly in relation to merger policy and the treatment of efficiency gains.

Innovation

Innovation is a central part of ERT's approach. ERT argues that competition should not be assessed solely through prices and market shares. Factors such as R&D, technological development, quality, data, investment and consumer choice should also be considered.

This is particularly important for industries where competition is based on technological leadership and long-term investment rather than simply price. ERT therefore wants innovation benefits and efficiencies to receive greater weight in competition assessments.

Use of international benchmarks

Benchmarking is an important element of ERT's broader competitiveness agenda. Rather than assessing Europe's performance only against its own historical performance, ERT compares the EU with major international competitors.

Its competitiveness and industry benchmarking work uses 64 key performance indicators to examine Europe's position relative to other major economies. The objective is to identify where Europe is losing competitiveness, where it remains strong and where policy intervention could improve its position.

This benchmarking approach supports ERT's wider argument that European competition and industrial policy should be assessed against the global competitive environment. The relevant question is not simply whether a European market is competitive internally, but also whether European companies have the scale, technology, capital and productivity necessary to compete internationally.

Overall position

ERT's position can therefore be summarised as a shift from a primarily internal-market perspective towards a more global competitiveness perspective.

Traditional approach: Competition → market shares → prices → consumer effects

ERT's preferred approach: **Competition → innovation → investment → scale → productivity → resilience → global competitiveness**

ERT is not advocating the abandonment of competition policy. Its argument is that competition policy should be modernised so that it does not unintentionally prevent European companies from achieving the scale and investment capacity necessary to compete with global rivals.

The underlying message is essentially:

Europe needs competition policy that protects competition while allowing European industry to achieve the scale, innovation and investment needed to compete globally.

This is also why benchmarks are important to ERT: they provide the empirical basis for arguing that Europe's industrial and competition framework should be

evaluated not only against conditions inside the EU, but against the performance of the US, China and other global competitors.

Foreign investment

ERT wants Europe to remain open to foreign direct investment, but to make Europe a more attractive place for international capital. Its concern is that the business case for investing in Europe has weakened: in ERT's late-2025 CEO survey, only 8% of CEOs planned to invest more in Europe than previously planned, while 38% had reduced or postponed investment plans.

The preferred approach is therefore not protectionism, but investment-friendly conditions: a deeper Single Market, lower energy costs, simpler regulation, faster permitting, deeper capital markets and predictable industrial policy. ERT argues that foreign investment should contribute to Europe's industrial capabilities and innovation rather than simply acquiring existing assets.

ERT is also concerned about foreign state-supported competitors. Its competition-policy position argues that European companies should not be constrained by EU rules while competing globally against companies benefiting from substantial state support abroad.

Public investment

ERT sees public investment primarily as a catalyst for private investment, rather than a substitute for it. Its 2026 recommendations for FP10 and the European Competitiveness Fund explicitly call for policies that "crowd in – not crowd out" private investment.

The priorities are particularly strong in areas where private investment alone is insufficient or too risky: advanced materials, biotechnology and life sciences, clean electrification, industrial AI, quantum, cybersecurity, semiconductors and strategic technologies. ERT wants European funding to create a much better pipeline from research to commercialisation and industrial scale.

Figure



Infrastructure is a major investment gap

ERT is particularly concerned about energy infrastructure. Its analysis estimates that Europe needs around €0.8 trillion of investment in energy infrastructure by 2030, rising to €2.5 trillion by 2050, including electricity grids, hydrogen infrastructure and CO_2 infrastructure. ERT explicitly sees this as requiring a combination of public and private capital.

For industrialists, this is crucial because cheap energy cannot be delivered simply through subsidies: Europe needs the physical infrastructure to connect renewable and low-carbon generation to industrial demand.

R&D and innovation

ERT sees public R&D investment as leverage for much larger private investment. Its latest FP10 position argues that EU R&D spending is insufficient compared with major global competitors and that EU programmes can generate substantial additional national and private co-investment.

The emphasis is therefore on moving from:

public research → technology development → scale-up → private investment → European industrial production.

ERT wants the European Competitiveness Fund and FP10 to provide that missing bridge. It proposes stronger industry involvement, easier access to data and computing infrastructure, regulatory sandboxes, deeper capital markets and public procurement that helps new technologies reach commercial scale.

Strategic industrial investment

ERT also supports targeted public support for critical industries and strategic value chains, particularly where Europe risks losing industrial capacity.

Its Clean Industrial Deal position calls for financial support for energy-intensive industries during the transition, affordable low-carbon energy, and investment in technologies such as circularity and decarbonisation. It also argues for European-level support for high-risk/high-return companies and deeper capital and debt markets.

The overall industrialist model

The ERT position can therefore be summarised as:

Public investment should de-risk and catalyse → private European investment should scale → foreign investment should add capital, technology and industrial capacity → infrastructure and energy investment should reduce costs → innovation investment should create globally competitive European companies.

The important distinction is that ERT is not primarily asking for permanent state ownership or unlimited subsidies. It is asking for the public sector to create the conditions and financing mechanisms that make large-scale private investment in Europe economically attractive again.

This fits directly with ERT's broader concern that Europe needs to close a very large investment gap. In its recent work, ERT cites the Draghi estimate of roughly €750–800 billion of additional annual investment needed for European competitiveness.

Europe should treat the expansion of solar and wind power not only as an energy and climate policy, but as an industrial competitiveness strategy. The central question is no longer simply how much renewable capacity Europe can build, but whether Europe can convert abundant clean electricity into lower energy costs, higher productivity and renewed investment in European industry.

ERT's recent work highlights the electricity grid as a critical bottleneck. Renewable generation is expanding, but connections to industry, households, electric vehicles and new data centres are increasingly constrained. Without major investment in transmission and distribution networks, Europe risks producing clean electricity without being able to deliver it efficiently to the places where it creates the greatest economic value.

The investment challenge therefore extends far beyond wind turbines and solar panels. Europe needs a complete electricity system capable of moving, storing and managing large quantities of renewable power. This means expanding grids, accelerating permitting, strengthening cross-border interconnections and investing in batteries, pumped hydro, hydrogen and other forms of flexibility. The objective should be to make renewable electricity not only clean, but abundant, reliable and competitively priced for European industry.

The next step is to translate this energy advantage into industrial productivity. European companies need to invest in electric furnaces, industrial heat pumps, electrolysers, automated production systems and other technologies that allow factories to replace fossil fuels with increasingly affordable electricity. The energy transition should therefore become an opportunity to modernise Europe's industrial capital stock and produce

more with less energy, less material and less labour.

Digitalisation can reinforce this transformation. Smart grids, sensors, AI-based forecasting, automated demand management and digital energy systems can allow electricity to be used more efficiently and help industry respond to periods of abundant and inexpensive renewable power. This creates a direct link between energy investment and productivity growth.

Europe must also ensure that the clean-energy transition creates industrial capacity within Europe. It should not simply import solar panels, batteries, turbines, grid equipment and other technologies while exporting the manufacturing opportunities associated with the transition. European strengths in advanced materials, engineering, clean technologies, industrial software and AI should be used to build globally competitive companies and supply chains. ERT's recommendations for FP10 and the European Competitiveness Fund emphasise the need for public funding to help technologies move from research and development into commercial and industrial scale.

This is particularly important for energy-intensive industries such as steel, chemicals, aluminium, cement and glass. Europe's competitiveness in these sectors has been weakened by high energy costs and the cost of the transition. The objective should therefore be to create conditions in which clean electricity becomes a competitive advantage rather than an additional cost. If renewable electricity can be supplied at scale and at predictable prices, Europe can use decarbonisation to attract new investment and retain industrial production.

Public investment has an important role, but it should primarily mobilise and leverage private capital. Public resources should concentrate on infrastructure, grids, research, first-of-a-kind technologies and areas where investment risks remain too high for the private sector. The objective should be to create the conditions in which companies have a strong economic incentive to invest, expand production and build new facilities in Europe.

The scale of the investment challenge is substantial. The European Commission estimates that energy investment needs to rise to around €660 billion annually in 2026–2030, increasing to around €695 billion annually in 2031–2040, compared with approximately €240 billion per year during 2011–2021.

The broader industrial strategy should therefore be to move from decarbonisation to productive electrification. Europe should use cheap renewable energy to modernise factories, accelerate automation and digitalisation, strengthen domestic supply chains, stimulate innovation and attract new private investment.

In simple terms, the ambition should not be “more solar and wind”. It should be:

More productive European industry powered by abundant, affordable and reliable clean energy.

That means connecting renewable generation, grids, storage, electrification, digitalisation, innovation and industrial investment into one competitiveness strategy. The success of Europe's energy transition should ultimately be measured not only by how many tonnes of emissions it removes, but also by whether it raises productivity, lowers industrial costs and makes Europe a more attractive place to invest and manufacture.

To increase productivity and industrial competitiveness in Europe, the basic objective should be to enable European companies to produce more, at lower cost, with better technology and less regulatory friction.

The most important opportunity is to bring down energy costs. Europe needs abundant renewable electricity, stronger grids, storage and faster electrification so that industry can access reliable and competitive energy. This is particularly important for steel, chemicals, aluminium, cement, glass and other energy-intensive sectors.

Europe also needs to raise investment per worker. Companies need to invest more in modern machinery, robotics, automation, AI, software and advanced manufacturing. Public policy should make it easier and more attractive for companies to invest in European factories rather than moving investment elsewhere.

Innovation and R&D are equally important. Europe has strong universities and research institutions, but too many technologies struggle to move from the laboratory into large-scale commercial production. The focus should therefore be on turning European research into European companies, factories and exports.

The Single Market should also work much better. Companies should be able to operate across Europe without facing 27 different regulatory systems, excessive reporting requirements or unnecessary barriers. A larger and more integrated market would allow European companies to achieve greater scale and productivity.

Europe also needs faster permitting and simpler regulation. Long approval processes increase the cost of

building factories, energy infrastructure and new technologies. Regulation should protect health, safety and the environment while being predictable and proportionate.

Another priority is skills. Industry needs engineers, technicians, electricians, software specialists and workers able to operate increasingly automated factories. Investment in vocational education, technical skills and lifelong training should therefore become a central part of industrial policy.

European companies also need better access to growth capital. Europe has many innovative start-ups but too often they scale in the United States or are acquired before becoming major European companies. Deeper European capital markets would help companies finance expansion and build large-scale businesses in Europe.

Finally, Europe needs to measure itself against global competitors. Productivity, energy costs, R&D spending, investment, industrial output, permitting times and technology adoption should be benchmarked against the US, China, Japan and other major industrial economies. This makes it possible to identify where Europe is falling behind and where policy needs to change.

The overall formula is:

Lower energy costs + more investment + faster innovation + better infrastructure + simpler regulation + stronger skills + deeper capital markets + a functioning Single Market = higher productivity and stronger European industry.

The key is to move from a policy focused mainly on protecting existing industry to one focused on making it more productive, innovative and capable of competing globally.

ETUC

ETUC sees industrial policy as essential to rebuilding Europe's productive capacity and reducing strategic dependencies. It supports a stronger European industrial base in areas such as steel, chemicals, automotive, energy, machinery, pharmaceuticals and clean technologies. The union argues that Europe should use the green and digital transitions to create new industrial capacity rather than allow production and investment to move outside Europe.

A central ETUC argument is that public investment must be much stronger. Europe needs investment in energy, electricity grids, transport, digital infrastructure, research and innovation, and the technologies required for decarbonisation. ETUC generally supports European-level financing because individual Member States do not have equal fiscal capacity to support their industries. This is closely linked to its support for a stronger European industrial policy and a permanent EU investment capacity.

On energy, ETUC argues that high energy prices are damaging European industry and workers. The transition away from fossil fuels therefore needs to deliver affordable and secure energy, particularly for energy-intensive industries. ETUC supports accelerated renewable deployment and electrification, but stresses that workers and industry need access to affordable energy during the transition.

On competitiveness, ETUC takes a different approach from many business organisations. It argues that Europe should not compete by lowering wages, weakening labour protections or reducing social standards. Instead, European competitiveness should come from productivity, innovation, skills, investment and high-quality employment.

This makes productivity particularly important. ETUC sees investment in workers as part of industrial competitiveness. Skills, vocational training, lifelong learning and worker participation in technological change are necessary if European companies are to benefit from automation, digitalisation and AI.

ETUC also places strong emphasis on worker involvement in industrial transformation. When factories are restructured, automated or decarbonised, workers and their representatives should be involved early in the process. ETUC supports stronger information, consultation and participation rights so that the transition is managed rather than imposed.

On industrial restructuring, ETUC is particularly concerned about deindustrialisation and plant closures. It argues that Europe needs to anticipate restructuring and support regions and workers before production disappears. Public support to companies should therefore be linked to conditions such as maintaining production, investment and employment in Europe.

On state aid, ETUC is broadly supportive of public support for strategic industries and the green transition, but wants it to come with social and industrial conditions. If taxpayers support a company, ETUC argues that there should be something in return: investment, employment, training, collective bargaining and European production.

The same principle applies to the green transition. ETUC's position is that decarbonisation should be a just transition. Workers in carbon-intensive industries should not simply

bear the cost of Europe's climate policies. Investment should come before closures, with reskilling, redeployment and regional investment where jobs are at risk.

There is therefore an important difference between the broad ERT/business perspective and the ETUC perspective.

ERT tends to frame the challenge as:

investment → innovation → productivity → competitiveness → industrial growth

ETUC adds:

investment → innovation → productivity → good jobs → higher wages → social stability → competitiveness

The two sides nevertheless overlap substantially on the need for more European investment, affordable energy, stronger industrial capacity, innovation, skills and a stronger European response to global competition.

The major disagreement is over who should benefit from competitiveness and what conditions should accompany public support. ETUC wants industrial policy to ensure that productivity gains and the benefits of the green and digital transitions are shared with workers rather than achieved through lower labour costs or weaker social protections.

FLAGSHIP PROJECTS

European industrial flagships are the companies and industrial ecosystems that can play a strategic role in strengthening Europe's competitiveness, resilience and economic security. They are closely linked to EU policy priorities such as the Clean Industrial Deal, energy and digital transition, defence, critical raw materials, semiconductors, advanced manufacturing and strategic autonomy. Strengthening these flagships can help Europe reduce external dependencies, scale up key technologies, secure critical supply chains and maintain a strong industrial base.

These companies can serve as **industrial flagships**, anchoring strategic value chains across Europe and helping smaller firms scale around them. Their role is not simply to increase corporate size, but to build European capacity in critical technologies, infrastructure and manufacturing. This supports the EU's goals of competitiveness, resilience and strategic autonomy.

Flagships can also help mobilise private investment, research and skills across Member States. Through tools such as the Competitiveness Coordination Tool and Important Projects of Common European Interest, the EU can coordinate major cross-border industrial investments.

The objective is therefore to create **European champions with strong domestic supply chains, global scale and strategic importance**, while maintaining a competitive Single Market.

Table A la EIB-Eurofer

Priority	**Sector**	**European flagships**	**Indicative public budget, 2027–32**	**Industry Counterpart**	**Main impact**
1	⚡ Energy, grids & electrification	Siemens, Schneider Electric, Prysmian, Nexans	**€60–80bn**	**€300–400bn**	Expand grids, reduce energy costs and enable industrial electrification
2	🛡 Defence & security	Airbus, Leonardo, Rheinmetall, Thales, Saab	**€100–150bn**	**€800bn+**	Build European defence production and strategic autonomy
3	🔬 Semiconductors & digital technology	ASML, STMicroelectronics, Infineon, NXP	**€35–50bn**	**€120–180bn**	Strengthen Europe's position in critical chips, equipment and AI infrastructure

4	Advanced manufacturing & automation	Siemens, Bosch, Schneider, Festo, KUKA	**€20–30bn**	**€100–150bn**	Raise productivity and accelerate Industry 4.0
5	Aerospace & space	Airbus, Safran, Leonardo, MTU Aero Engines	**€25–35bn**	**€100–150bn**	Maintain European technological leadership and defence capabilities
6	Chemicals & advanced materials	BASF, Evonik, Solvay, Arkema	**€25–35bn**	**€120–170bn**	Secure critical industrial inputs while decarbonising production
7	Automotive & batteries	Volkswagen, BMW, Mercedes-Benz, Stellantis, Renault, Verkor	**€35–50bn**	**€200–300bn**	Preserve Europe's automotive base and accelerate EV supply chains
8	Critical raw materials & metals	Umicore, Solvay, Aurubis	**€20–30bn**	**€60–100bn**	Reduce dependence on China for minerals, refining and recycling
9	Pharmaceuticals & life sciences	Sanofi, Novo Nordisk, Bayer, Merck KGaA	**€20–30bn**	**€80–120bn**	Strengthen European medicine and biotechnology supply chains
10	Industrial machinery & engineering	Siemens, Bosch, Festo, Schaeffler, Danieli	**€20–30bn**	**€100–150bn**	Strengthen Europe's core manufacturing and export capacity

Recommended overall envelope

Rather than establishing ten separate sectoral funds, the proposal should create a single European Industrial Flagships framework, with differentiated funding windows for the ten strategic sectors. This would allow the EU to concentrate capital where it can generate the greatest strategic and economic impact, while avoiding fragmentation and duplication between existing EU and national programmes.

I would propose an indicative €360–520 billion public investment and support envelope for 2027–2036, combining EU resources, Member State co-financing, EIB financing, guarantees and targeted industrial incentives. The objective would be to mobilise at least €2 trillion of total public and private investment, implying a substantial leverage effect rather than direct public financing of the entire investment requirement.

The funding should be conditional on European value creation: investment in European production capacity, R&D, skills, supply chains, infrastructure and critical technologies. Support should favour projects that create cross-border European value chains and strengthen the EU's capacity to manufacture strategically important products at scale.

The strategic logic can be expressed simply:

Energy → technology → manufacturing → strategic materials → defence → resilient European supply chains.

This approach also creates important cross-sectoral industrial flagships. Companies such as Siemens, Schneider Electric, ASML, Airbus, Leonardo, Bosch and Prysmian are particularly important because their technologies and supply chains support several strategic sectors simultaneously. They can therefore act as anchor companies, around which European SMEs, research institutions, suppliers and infrastructure providers can scale.

The objective should not be to create protected national champions. It should be to create European-scale industrial ecosystems capable of competing globally, while reducing critical dependencies and increasing Europe's capacity to respond to future economic, technological, energy and security shocks.

Indicative policy ambition for 2027–2032:

- €360–520bn public investment and financial support
- €2tn+ total investment mobilised
- Stronger European production capacity in 10 strategic industrial sectors
- Greater participation of European SMEs and suppliers in flagship value chains
- Increased R&D, manufacturing and skilled employment within the EU
- Reduced exposure to critical external dependencies
- Stronger European export capacity and global industrial competitiveness

The underlying principle is therefore “public capital to crowd in private capital, European demand to build European supply, and flagship companies to anchor competitive industrial ecosystems.”

Summary

Europe's industrial future has become one of the defining questions of the European project. Faced with rising global competition, technological disruption and geopolitical uncertainty, Europe's institutions and social partners increasingly agree that a stronger industrial strategy is essential. The European Round Table for Industry argues that Europe must create the conditions for companies to invest, innovate and grow at scale. In its words, Europe must ensure that its rules "empower rather than constrain its industries" if it is to remain globally competitive. (ERT)

For business leaders, the challenge is not only to decarbonise but also to strengthen productivity, investment and industrial capacity. They see the completion of the Single Market, lower energy costs and greater support for innovation as critical foundations for growth. Trade unions share the sense of urgency but emphasise a different dimension of competitiveness. As ETUC General Secretary Esther Lynch observed, "Europe is facing a real competitiveness challenge." Yet she also argues that "European competitiveness will not be rebuilt through deregulation" and that Europe instead needs "a proactive industrial policy."

The European Commission seeks to bridge these perspectives through its Competitiveness Compass and Clean Industrial Deal. Its vision is to combine competitiveness, decarbonisation, innovation and economic security into a single strategy. The objective is to transform the green transition into a source of industrial renewal rather than industrial decline. Affordable clean energy, technological leadership and investment are viewed as the foundations of future prosperity.

The European Parliament broadly supports this approach and has called for "robust and well-targeted industrial policy" to strengthen Europe's industrial base.Parliament argues that industrial policy must support innovation, resilience and high-quality jobs while ensuring that Europe remains a global industrial power. It has repeatedly stressed that competitiveness and decarbonisation should reinforce one another rather than pull in opposite directions.

The Council of the European Union has reinforced these ambitions by calling for greater productivity, stronger competitiveness and a deeper Single Market. It focuses on translating strategic goals into practical action through investment, infrastructure, simplification and implementation. European leaders increasingly see industrial policy as central to resilience, economic security and long-term growth.

Despite differences in emphasis, a remarkable convergence is emerging. Business leaders want scale, investment and innovation. Trade unions want investment, quality jobs and a just transition. The Commission seeks to align competitiveness with sustainability, while Parliament and the Council support a stronger industrial base capable of thriving in a rapidly changing world. Together, they point towards a common conclusion: Europe's future prosperity depends on its ability to invest, innovate and produce.

As ERT warns, Europe must ensure its policies "empower rather than constrain its industries." As ETUC reminds policymakers, "Europe is facing a real competitiveness challenge" that requires "a proactive industrial policy." And as Parliament insists, "robust and well-targeted industrial policy" is indispensable for a strong and sustainable industrial base. The emerging European consensus is therefore clear: competitiveness, innovation, affordable energy, quality jobs and industrial investment are not competing objectives but mutually reinforcing pillars of a stronger European economy.

For a broader mapping of EU industrial policy, the main institutional and stakeholder positions can be understood as follows.

European Commission — sets the policy framework and drives implementation. Its approach is to combine competitiveness, decarbonisation, innovation and economic security through the Competitiveness Compass, the Clean Industrial Deal and measures to strengthen the Single Market. The Commission wants Europe to close its productivity and innovation gap, reduce energy costs, attract investment and build stronger strategic industries.

European Parliament — provides political direction and democratic scrutiny. Parliament strongly supports a strong European industrial base, greater investment, affordable clean energy, innovation and strategic autonomy. It argues that Europe must decarbonise without deindustrialising and wants industrial policy to support high-quality jobs, European manufacturing and technological leadership. It also supports stronger action against unfair international competition and greater European investment in strategic technologies and infrastructure.

Council / European Council — turns the strategy into political commitments and Member State action. The Council emphasises competitiveness, productivity, energy costs, simplification, investment and the Single Market. European leaders have called for a stronger industrial base and a major acceleration of action to reduce regulatory barriers and improve Europe's investment environment. The Council is particularly concerned with ensuring that EU policy is implemented effectively across Member States.

ERT / BusinessEurope — represents major business and employers. Their central message is that Europe needs scale, investment, innovation, affordable energy and a more competitive regulatory environment if European companies are to compete globally. They emphasise reducing the cost of doing business, strengthening the Single Market and mobilising private investment.

ETUC — represents European workers and trade unions. ETUC supports stronger industrial investment and competitiveness, but argues that this must go together with good-quality employment, worker participation, skills, collective bargaining and a just transition. It does not want European competitiveness to be achieved through lower wages or weaker social standards.

The overall European industrial-policy debate can therefore be summarised as:

Commission: build the policy framework for competitiveness and industrial transformation.

Parliament: strengthen European industry while ensuring investment, jobs, innovation and strategic autonomy.

Council: turn these priorities into concrete action by Member States and the EU, with less regulation, lower costs and stronger industrial capacity.

ERT / BusinessEurope: create the conditions for companies to invest, innovate, scale and compete globally.

ETUC: ensure that industrial competitiveness delivers investment, productivity and quality jobs while managing the green and digital transitions fairly.

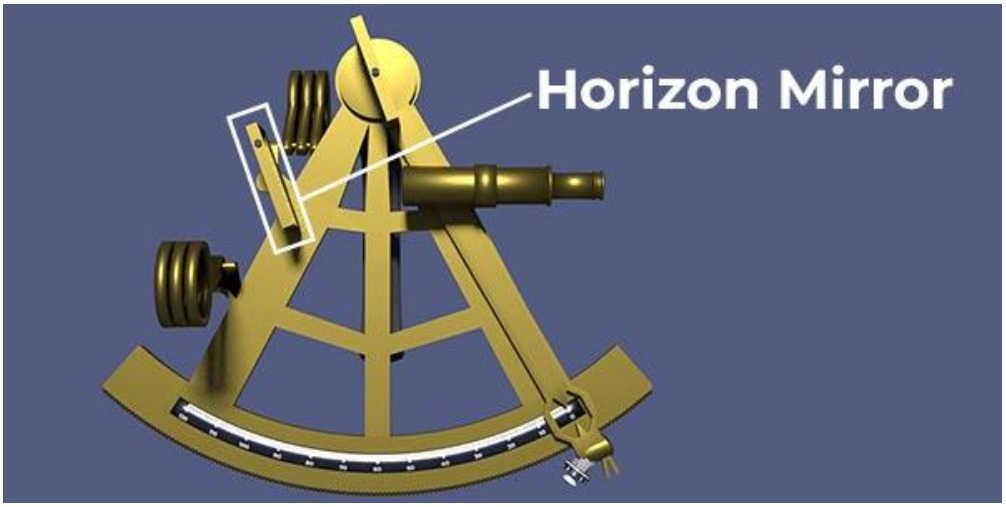
Cefic+energy+intensive industry: Cheap clean energy, decarbonisation finance and protection against carbon leakage.

There is a political consensus on (1) Europe needs more investment, (2) lower energy costs,(3) faster innovation, (4)stronger infrastructure, (5) better skills and a (5) more effective Single Market. The main differences concern how much public intervention is appropriate, the conditions attached to industrial support, the role of competition policy, and how the benefits and costs of the transition should be distributed between companies, governments and workers.

By adopting flagship projects, the EU Commision could also better mobilise support behind the continental unification strategy.

Consider also a stakeholder-based Industrial Governance Forum to asses each strategic ecossytem – automotive, chemicals, aerospace, semoconductors, medical technology, energy equipment, defence against shared KPI.

Figure Mirror Sextant with False Horisont compare the observed position with the calculated position when the sun is not out



9.The Externalisation of EU Industrial Policy

Nancy Adler theorises the process by which organisations develop an external dimension through globalisation and internationalisation, something we must assume happens on the back of US-led multinational companies interests. She argues that organisations do not operate in isolation from their external environment. They must understand differences in culture, values, behaviours, and management practices across countries. Adler highlights that cultural differences can strongly influence how organisations work and communicate. As organisations expand internationally, managers need to adapt their strategies to different cultural contexts. This process involves moving beyond an ethnocentric view, where one's own culture is seen as the standard. Organisations should instead recognise and value different perspectives and ways of working. Adler therefore emphasises cross-cultural management as an important organisational capability. The external dimension develops when organisations interact more effectively with international stakeholders and markets. Ultimately, this helps organisations become more globally aware, flexible, and effective. Nancy Adler's theory can be applied to the digital industry and to the reindustrialisation of the European economy by focusing on how organisations respond to their external environment. The digital industry connects European organisations to global markets, technologies and competitors, requiring them to understand different cultures, consumer behaviours and international business practices. This creates an external dimension in which organisations increasingly depend on international networks, knowledge and innovation. For Europe, digitalisation can support reindustrialisation by making manufacturing more productive, innovative and competitive. Technologies such as AI, automation, robotics and digital platforms can strengthen European industry. At the same time, reindustrialisation aims to reduce excessive dependence on external suppliers for strategically important products and technologies. From Adler's perspective, European organisations should recognise cultural differences and learn from international approaches rather than imposing their own practices. Cooperation between companies, governments, universities and international partners can therefore contribute to European industrial development. Overall, digitalisation and reindustrialisation require European organisations to become more globally oriented, culturally aware and adaptable.

The European Union's industrial policy has increasingly acquired an external dimension. Once principally concerned with the organisation of production, competition, and market integration within the European single market, EU industrial policy now extends beyond the Union's territorial boundaries. This development reflects a broader transformation in the relationship between economic governance and external relations: the EU increasingly seeks to shape the conditions under which firms produce, trade, invest, and compete not only within Europe but across global value chains. The externalisation of industrial policy therefore refers not simply to the internationalisation of European industry, but to the deliberate projection of EU regulatory, economic, technological, and strategic priorities into the wider international economy.

This development is particularly significant because the EU exercises influence in the global economy through instruments that are neither purely commercial nor conventionally geopolitical. Its regulatory capacity, market size, competition regime, trade agreements,

investment instruments, standards, and increasingly its economic-security policies provide mechanisms through which internal policy objectives can be projected outward. Bradford (2020) famously characterises this phenomenon as the *Brussels Effect*: the capacity of the European market to induce firms and governments outside the EU to adapt to European rules because access to the single market is economically valuable. In this sense, the externalisation of industrial policy is partly an extension of the EU's regulatory power. Yet it is also becoming more strategic. In response to geopolitical rivalry, supply-chain vulnerabilities, technological competition, and the green transition, the Union increasingly seeks not merely to regulate global markets but to shape their underlying structures.

The origins of this externalisation lie partly in the changing nature of European production. European industry is deeply embedded in global value chains, meaning that the competitiveness of European firms depends upon access to foreign markets, raw materials, technologies, components, capital, and specialised production networks. As Gereffi, Humphrey, and Sturgeon (2005) demonstrate, contemporary production is organised through complex transnational networks in which value is distributed across multiple jurisdictions. Industrial policy can therefore no longer be conceived solely as a domestic exercise. Measures concerning critical raw materials, semiconductors, batteries, energy, digital technologies, and advanced manufacturing necessarily have an external dimension because the relevant inputs, suppliers, markets, and competitors are globally distributed.

The EU's trade policy has consequently become an important vehicle for industrial-policy objectives. Trade agreements do more than reduce tariffs: they establish rules concerning standards, intellectual property, public procurement, investment, subsidies, and market access. Through such agreements, the EU can attempt to secure favourable conditions for European producers while simultaneously disseminating regulatory preferences abroad. Meunier and Nicolaïdis (2006) describe the EU's capacity to act internationally through the aggregation of member states' market power as a form of "collective power." This power is particularly consequential in trade because the EU negotiates externally as a single economic bloc. The result is an asymmetry between the fragmented political authority of the member states and the considerable external bargaining power of the Union as a whole.

The regulatory dimension of this process is equally important. European standards frequently become de facto international standards because multinational firms may find it economically inefficient to produce different versions of a product for different regulatory markets. The EU's environmental and digital regulations illustrate this mechanism particularly clearly. The logic is not necessarily coercive: firms may voluntarily adopt European requirements because the cost of maintaining separate production systems exceeds the cost of complying with EU standards globally. Bradford (2020) argues that this dynamic allows the EU to exercise influence beyond the formal jurisdiction of its institutions. Industrial policy thus becomes externalised through the architecture of the market itself.

The emergence of the European Green Deal has intensified this tendency. Climate policy increasingly intersects with industrial competitiveness, trade, and global production. The Carbon Border Adjustment Mechanism (CBAM), for example, illustrates how an internal environmental objective can acquire an external industrial-policy function. By imposing a carbon-related cost on certain imports, the EU seeks to reduce the risk of carbon leakage while creating incentives for producers outside Europe to reduce the carbon intensity of their production. The instrument consequently operates simultaneously as climate policy, trade policy, and an attempt to reshape competitive conditions between European and non-European producers. In this respect, the externalisation of EU industrial policy is not simply about exporting industrial preferences; it involves embedding those preferences in the conditions governing access to the European market.

A similar transformation can be observed in the digital sphere. European regulation of digital markets, artificial intelligence, data protection, and platform governance has implications for companies operating globally. The General Data Protection Regulation (GDPR), for instance, demonstrated how rules formally designed for the European market could affect corporate practices beyond Europe. The significance of such regulation lies not merely in its legal scope but in the structural importance of the European consumer market. International companies often have incentives to adopt EU-compatible practices across their operations rather than maintain entirely separate regulatory systems. The EU therefore possesses a distinctive form of industrial influence: it can alter the competitive environment by determining the regulatory conditions under which global firms seek access to its market.

Yet the externalisation of industrial policy has entered a new phase in which regulation alone is insufficient. The geopolitical shocks of recent years have exposed the vulnerabilities associated with excessive dependence on concentrated foreign supply chains. The COVID-19

pandemic, Russia's invasion of Ukraine, disruptions in global logistics, and growing strategic competition between the United States and China have encouraged policymakers to reinterpret industrial competitiveness through the language of resilience and economic security. As a result, the EU has increasingly moved towards policies designed to secure strategic capacities in areas considered essential to its economic and political autonomy.

This shift is captured by the concept of "open strategic autonomy." Rather than pursuing complete economic self-sufficiency, the EU seeks to preserve the advantages of international economic integration while reducing excessive dependencies in strategically sensitive sectors. This distinction is crucial. Externalisation does not necessarily mean withdrawal from global markets. On the contrary, EU industrial policy increasingly aims to manage interdependence. The objective is to determine which dependencies are economically beneficial, which are politically risky, and where European capabilities should be strengthened through domestic investment, diversification, partnerships, or international agreements.

The European Chips Act, the Critical Raw Materials Act, and policies directed towards clean technologies exemplify this emerging approach. These initiatives seek simultaneously to strengthen European production capacity and to restructure international relationships with suppliers and technology partners. The external dimension therefore becomes constitutive of industrial policy itself. Securing critical raw materials, for example, requires relationships with resource-rich countries; developing semiconductor capacity requires technological partnerships and investment networks; and accelerating the green transition requires access to international markets and supply chains. Industrial strategy and external economic relations consequently become increasingly difficult to separate.

This development also changes the EU's relationship with traditional notions of power. The Union remains unusual as an international actor because it does not possess the conventional military capabilities of a great power, yet it exercises substantial structural influence through its market and regulatory institutions. Farrell and Newman (2019) conceptualise such power through the idea of "weaponized interdependence," whereby states and political institutions can exploit central positions within global economic networks. The EU's position as a major market and regulatory jurisdiction gives it important leverage over multinational firms and international economic relationships. Externalised industrial policy can therefore function as a form of structural power: rather than commanding other actors directly, the EU shapes the incentives and constraints within which they operate.

However, the externalisation of EU industrial policy also produces tensions. The first concerns the relationship between openness and protection. Industrial policy measures intended to strengthen European resilience may be perceived externally as protectionist, particularly when they favour European production through subsidies, procurement rules, or regulatory requirements. The EU consequently faces a persistent dilemma. If it intervenes too weakly, European industries may remain vulnerable to foreign subsidies, concentrated supply chains, or technological dependencies. If it intervenes too aggressively, it risks fragmenting global markets and provoking retaliatory measures from trading partners.

A second tension concerns the legitimacy of regulatory externalisation. The Brussels Effect can be understood as a form of regulatory influence, but it also raises questions about accountability. Actors outside the EU may be substantially affected by European rules without possessing equivalent influence over the institutions that formulate them. This creates a form of regulatory asymmetry: the EU can exercise considerable influence over global production while remaining formally accountable primarily to European citizens and institutions. The externalisation of industrial policy therefore raises not only questions of economic effectiveness but also questions about the political legitimacy of European power.

A third challenge concerns coordination among member states. Industrial policy was historically associated with national economic strategies, and governments continue to differ in their industrial structures, fiscal capacities, and strategic preferences. A common European external industrial policy therefore requires balancing divergent national interests. Larger member states may possess greater fiscal capacity to support domestic industries, creating concerns that national subsidies could fragment the single market. Conversely, excessive centralisation may limit the ability of member states to respond to sector-specific economic needs. The effectiveness of EU industrial policy consequently depends upon maintaining coherence between national industrial strategies and collective European objectives.

The externalisation of industrial policy should therefore be understood as part of a broader transformation of the EU's role in the international political economy. The Union is moving from a model in which economic integration and liberalisation constituted the dominant framework towards a more strategic conception of interdependence.

Trade remains central, but trade is increasingly embedded within concerns about technological sovereignty, climate policy, supply-chain resilience, economic security, and geopolitical competition. Industrial policy is consequently becoming an instrument through which the EU seeks to govern the vulnerabilities created by globalisation rather than simply maximise the efficiency gains associated with it.

Ultimately, the externalisation of EU industrial policy reflects a paradox at the heart of European economic power. The EU's influence abroad derives substantially from its openness: the size of its market, the integration of its economy, and the attractiveness of access to European consumers have created the conditions for regulatory and commercial influence. Yet geopolitical and economic pressures are encouraging the Union to use that influence more strategically. The challenge is therefore not to choose between openness and autonomy in absolute terms, but to construct a form of strategic openness capable of reconciling the benefits of global integration with the requirements of resilience and political agency.

Seen in this light, the externalisation of EU industrial policy is neither simply the internationalisation of domestic economic policy nor a straightforward turn towards protectionism. It represents a more fundamental transformation in how the EU understands economic power. Regulation, market access, trade, investment, technological capacity, environmental standards, and supply-chain security are increasingly treated as interconnected instruments of European influence. The result is an EU that seeks not merely to participate in global markets but to shape the institutional and material conditions under which those markets operate. The externalisation of industrial policy is therefore becoming one of the principal ways through which the European Union attempts to translate its economic weight into strategic power.

US-CHINA INDUSTRIAL COMPETITION

The implications of US–Chinese industrial competition for production include a shift away from highly concentrated production in China. Firms are increasingly diversifying their manufacturing through "China + 1" strategies, expanding production into countries such as Vietnam, India and Mexico. Governments are also encouraging reshoring and friend-shoring of strategically important industries such as semiconductors, batteries and critical minerals. Although this can increase production costs, it can make supply chains more resilient and reduce geopolitical risks.

In terms of location, firms are increasingly considering political stability, tariffs, access to markets and geopolitical risk alongside labour costs. This makes countries such as **Mexico, India and those in Southeast Asia** more attractive alternatives to China.

Regarding the organisation of supply chains, companies are diversifying their suppliers and production sites rather than depending heavily on a single country. This reduces vulnerability to trade disputes, tariffs and disruptions.

For technology and innovation, competition between the US and China is increasing investment in research and development, automation, artificial intelligence, semiconductors and advanced manufacturing. Export controls are also limiting the transfer of some high-tech products and technologies.

In terms of labour, greater use of automation allows firms to reduce their dependence on low-cost labour. Manufacturing is therefore becoming increasingly capital-intensive and skill-intensive.

Finally, markets and trade are influencing where production takes place. Tariffs and trade restrictions encourage firms to produce closer to their target markets, potentially creating more regional production networks, such as manufacturing in Mexico for the US market or Eastern Europe for the European market.

For the **EU industrial strategy**, US–Chinese competition means the EU cannot simply compete on low production costs. It needs to combine **competitiveness, technological sovereignty, resilience and the green transition**.

What does US–China competition mean for EU industrial strategy?

The EU needs to reduce excessive dependence on China for critical inputs and technologies while also avoiding becoming completely dependent on the US. This means developing stronger European capabilities in areas such as **semiconductors, batteries, renewable technologies, critical raw materials, defence and digital technologies**.

It also means strengthening **European supply chains**. Rather than concentrating production in one country, the EU can diversify suppliers, develop strategic stockpiles and build stronger production capacity within Europe or with trusted trading partners.

A second implication is that the EU needs to remain **competitive in global markets**. The US is using large-scale subsidies through policies such as the Inflation Reduction Act, while China provides substantial state support to strategic industries. The EU therefore needs

appropriate financial support, investment and a regulatory environment that allows European firms to scale.

The EU also has to link industrial policy to the **green transition**. Instead of simply importing green technologies from China, industrial strategy should aim to develop European capabilities in areas such as batteries, wind turbines, solar technology, hydrogen and clean manufacturing.

Finally, the EU needs to strengthen its **single market**. One of Europe's disadvantages is that firms operate across 27 national markets with different regulations, tax systems and investment conditions. A deeper single market can allow European companies to achieve the scale needed to compete with US and Chinese firms.

You're right. I misunderstood **"abroad"** as "where EU firms invest abroad." You mean **which EU industries seek to locate abroad geographically, and what determines those locations**.

For EU industrial strategy, the important distinction is between **industries that internationalise production** and industries that the EU considers **strategic enough to retain or expand inside Europe**.

Which industries are impacted by US-China Industrial competition

The main industries affected by US–Chinese industrial competition are automobiles and electric vehicles, as Chinese EV producers put pressure on European manufacturers. Batteries are also heavily affected because China dominates battery production and key components. Solar photovoltaic manufacturing faces strong Chinese competition due to China's large-scale, low-cost production. Semiconductors and advanced electronics are affected by US–China technology restrictions and competition for technological leadership. Steel, aluminium and chemicals face pressure from Chinese overcapacity and Europe's relatively high energy costs. Wind and other clean technologies are also increasingly exposed to competition from Chinese manufacturers. Critical raw materials, including rare earths, lithium and graphite, create strategic vulnerabilities because China dominates important stages of their supply chains. Finally, robotics, AI and other advanced manufacturing technologies are affected because the US and China are investing heavily to gain technological and industrial leadership.

Table

EU industry	What the EU is trying to do	Where activity is concentrated/being developed
Semiconductors	Increase European production and reduce dependence on Asia	Germany, France, Italy, Netherlands, Ireland
Batteries & EVs	Build a European battery and electric-vehicle supply chain	Germany, France, Hungary, Poland, Sweden, Spain
Renewable energy	Retain manufacturing capacity in solar, wind and other clean technologies	Germany, Denmark, Spain, France, Netherlands
Critical raw materials	Reduce dependence on China and diversify imports	Mining within EU + Norway, Australia, Canada, Africa and Latin America
Defence	Increase European production and reduce dependence on the US	France, Germany, Italy, Spain, Sweden, Poland and other member states
AI & digital technologies	Build European technological capabilities and data infrastructure	France, Germany, Netherlands, Ireland and major European tech hubs
Pharmaceuticals	Strengthen production of medicines and active ingredients	Germany, France, Italy, Belgium, Ireland, Denmark

Chemicals	Maintain a competitive industrial base while decarbonising	Germany, Netherlands, Belgium, France
Aerospace	Maintain technological leadership and strategic autonomy	France, Germany, Spain, Italy
Green hydrogen	Develop European clean-energy production and industrial uses	Spain, Portugal, Germany, Netherlands, Denmark

The important geographical point

EU industrial strategy is not simply about "bringing everything back to Europe." The EU is effectively pursuing three geographical strategies:

1. Keep strategic production in Europe.
For sectors where security and technological capability matter—such as semiconductors, defence, pharmaceuticals and batteries—the EU wants sufficient European production capacity.

2. Diversify production and suppliers internationally.
For raw materials and other inputs that cannot realistically be produced in Europe, the EU wants multiple reliable suppliers rather than dependence on China. This is where partnerships with countries such as Canada, Australia, Norway and countries in Africa and Latin America become important.

3. Concentrate production where Europe has a competitive advantage.
Not every EU country should produce everything. Industrial activity tends to cluster around existing skills, infrastructure, suppliers, energy availability and research institutions. For example, automotive production is particularly important in Germany, Central Europe and Spain, while aerospace has strong clusters around France, Germany, Spain and Italy.

So the underlying principle is:

US–China competition → EU industrial strategy → selective reshoring + diversification + industrial clustering + technological upgrading.

The EU is therefore trying to answer the question "What should Europe produce itself, what should it produce with partners, and what can it safely import?" That is probably the clearest way to understand the geographical dimension of EU industrial strategy.

EU industries that locate production abroad

Labour-intensive industries such as textiles, clothing, footwear and some consumer goods tend to locate abroad where labour costs are lower. Common locations include **Bangladesh, Vietnam, Türkiye, North Africa and parts of Eastern Europe**.

Resource-intensive industries locate abroad where essential raw materials or cheap energy are available. European companies may therefore invest in **mining, metals and chemicals** in places with abundant resources or cheaper energy, such as Australia, Canada, Latin America, the Middle East and Africa.

Energy-intensive manufacturing—for example chemicals, steel, aluminium and fertilisers—can be attracted to countries with much cheaper energy. This is particularly relevant to the EU because European energy prices can be relatively high.

Market-oriented industries locate abroad to be physically close to major consumers and avoid trade barriers. European automotive, machinery, pharmaceutical and consumer-goods companies therefore produce in **the US, China, Mexico and other large markets**, rather than exporting everything from Europe.

Technology-intensive industries may locate particular stages abroad because production ecosystems are already concentrated there. Electronics, for example, depend heavily on **East Asian semiconductor and component ecosystems**.

What this means for EU industrial strategy

The EU therefore shouldn't try to bring **all production** back to Europe. That would be economically inefficient.

Instead, industrial strategy asks:

Which production should Europe keep at home? Strategic technologies, defence, pharmaceuticals, semiconductors, critical infrastructure and some clean technologies.

Which production can be located in neighbouring countries?
More cost-sensitive manufacturing can be moved to countries geographically close to the EU while retaining relatively short supply chains.

Which inputs must be sourced abroad? Raw materials and other goods that Europe cannot efficiently produce domestically.

Which activities should be located near foreign markets? Production for the US, Chinese and other large markets can remain local to those markets.

So the geographical logic is:

Cost advantage → production abroad
Resource advantage → production abroad
Market access → production abroad
Strategic/security considerations → production in Europe
Need for resilience → diversification across several locations

This is the core tension in EU industrial strategy: **Europe wants to remain open to international production and trade, while preventing strategic dependence on any single foreign location.**

Creating a More Cooperative Business Environment: Intra-EU and Extra-EU Dimensions

A comprehensive European strategy to foster business cooperation should address both the internal European market and the EU's relationships with external partners. While intra-EU measures should focus on reducing fragmentation and encouraging collaboration among European firms, extra-EU measures should strengthen partnerships with strategically important regions such as the Middle East, Africa, Asia, and North America.

Intra-EU Cooperation: Strengthening Collaboration Within Europe

Within the European Union, the primary objective should be to make cooperation between firms across member states as seamless as cooperation within a single national market. Despite decades of integration, businesses still face regulatory divergences, administrative burdens, and market fragmentation that discourage cross-border partnerships. Completing the Single Market should therefore remain a central priority. Greater harmonization of standards, certifications, reporting requirements, and digital procedures would significantly reduce the costs associated with operating across multiple jurisdictions.

In parallel, the EU should invest in common digital infrastructure that facilitates trust and interoperability among businesses. A European Business Wallet, interoperable digital identities, standardized e-invoicing systems, and secure data-sharing frameworks would lower transaction costs and simplify collaboration between firms of different sizes and from different member states.

The Union should also reinforce industrial and innovation ecosystems that connect businesses across borders. Cross-border industrial clusters in strategic sectors such as artificial intelligence, clean technologies, biotechnology, aerospace, advanced manufacturing, and semiconductors can create networks through which firms exchange knowledge, develop joint projects, and access new markets. Such ecosystems are particularly valuable for small and medium-sized enterprises, which often lack the resources and international networks available to larger corporations.

Research and innovation policies should further incentivize cooperation by prioritizing projects that involve multiple companies from different member states. Public funding mechanisms could place greater emphasis on collaborative ventures that generate European value chains and encourage technology transfer across borders. By promoting joint innovation rather than isolated national initiatives, the EU can strengthen its competitiveness while deepening business integration.

Finally, a stronger focus on European value chains would improve resilience and encourage interdependence among firms. Strategic sectors such as energy technologies, critical raw materials, pharmaceuticals, and advanced manufacturing would benefit from greater coordination between suppliers, producers, and service providers located throughout the Union. Such integration would not only enhance economic efficiency but also reduce vulnerabilities arising from excessive dependence on external suppliers.

Extra-EU Cooperation: Building Strategic Partnerships Beyond Europe

Beyond its internal market, the EU should pursue a proactive strategy to strengthen business cooperation with key global regions. Among these, the Middle East—particularly the Gulf Cooperation Council (GCC) countries—offers significant opportunities due to its growing investments in infrastructure, energy transition, digital technologies, logistics, and advanced industries.

The EU should establish structured business cooperation frameworks with Gulf partners, creating regular platforms where European and Middle Eastern companies can identify investment opportunities, develop joint ventures, and exchange expertise. Such initiatives would complement broader diplomatic and economic relations while creating tangible commercial opportunities for firms on both sides.

Trade and investment agreements should play a central role in facilitating these partnerships. Reducing regulatory barriers, improving investment protections, and streamlining procedures for cross-border business activity would make it easier for European companies to enter foreign markets and cooperate with international partners. Enhanced economic agreements can also provide the stability and predictability required for long-term investments.

A particularly promising area for cooperation lies in the creation of innovation corridors linking European technological capabilities with foreign capital and market opportunities. Joint initiatives in renewable energy, hydrogen production, artificial intelligence, smart infrastructure, and sustainable mobility could combine Europe's technological strengths with the ambitious development strategies pursued by many Middle Eastern economies. Such partnerships would enable both regions to accelerate innovation while addressing common economic and environmental challenges.

The EU should also support the internationalization of its small and medium-sized enterprises. Many SMEs possess highly competitive products and technologies but lack the knowledge, networks, or financial resources needed to expand abroad. Enhanced export support services, market intelligence programs, business matchmaking initiatives, and financing instruments could help these firms establish partnerships beyond Europe and participate more effectively in global value chains.

Moreover, deeper cooperation on supply chains and strategic infrastructure would generate mutual benefits. Joint investments in ports, logistics networks, digital connectivity, energy systems, and critical raw materials can improve economic resilience while creating opportunities for businesses from both regions. Such partnerships are increasingly important in a global environment characterized by geopolitical uncertainty and supply-chain disruptions.

Same set of Trade Rules

A key opportunity lies in combining **nearshoring to Southern Europe** with **strategic partnerships across the Mediterranean and the Gulf**. Through the Pan-Euro-Mediterranean (PEM) Convention, companies can source, process, and manufacture products across a broad network of European and Mediterranean countries while benefiting from preferential rules of origin and integrated supply chains. This allows businesses to organize production across multiple jurisdictions while maintaining preferential access to European markets.

This creates a distinctive competitive advantage for Southern European businesses. Rather than viewing nearshoring solely as the relocation of production from Asia to the EU, firms can develop integrated Euro-Mediterranean value chains. For example, research and design activities could remain in Germany, France, or the Benelux countries, advanced manufacturing could be located in Italy or Spain, labor-intensive production stages could take place in Morocco, Tunisia, or Egypt, and final distribution could be managed through European logistics hubs. Under the PEM framework, these production stages can be combined more efficiently than under traditional bilateral trade arrangements.

The Middle East adds a second dimension to this strategy. Gulf countries possess substantial investment capital and are pursuing ambitious economic diversification programs focused on clean energy, artificial intelligence, advanced manufacturing, logistics, and infrastructure. European firms can leverage their regulatory expertise, technology, and industrial know-how while partnering with Gulf investors and project developers. The European Commission itself identifies trade, investment, connectivity, clean technology, and renewable energy partnerships with the Gulf as strategic priorities.

Several types of cooperative business projects could emerge from this approach. European renewable energy companies and Gulf energy firms could jointly develop hydrogen production and export corridors linking North Africa, the Gulf, and Europe. European technology companies could establish AI and data-center partnerships financed by Gulf sovereign wealth funds. Southern European ports could cooperate with Gulf logistics operators to create integrated trade corridors connecting Europe, the Middle East, and Africa. Manufacturing firms could build distributed supply chains in which production is shared between Southern Europe and Mediterranean partner countries while serving the broader EU market.

In this sense, Southern Europe could become more than a location for nearshoring. It could evolve into a strategic platform where European regulations, Mediterranean production networks, and Middle Eastern capital converge. By leveraging existing EU trade frameworks and

deepening cooperation with neighboring regions, the EU can create an ecosystem in which businesses benefit simultaneously from the stability of the European market, the cost advantages of regionalized supply chains, and the investment opportunities offered by the Gulf and broader Middle East. This would strengthen Europe's competitiveness while fostering greater economic integration across the wider Euro-Mediterranean region.

EURO-Mediterranean Gateway for Asian Supply Chains

Chinese or Indian companies could establish manufacturing, assembly, packaging, finishing, or distribution operations in Southern EU countries such as **Spain, Italy, Greece, Portugal, Malta or Cyprus**, while also using Mediterranean partner countries such as Morocco, Egypt, Tunisia or Turkey for complementary production stages. The resulting supply chain could connect **Asia → Mediterranean → Southern Europe → the EU Single Market**.

Once non-EU goods are imported into the EU and properly cleared through customs, they can circulate freely throughout the EU without additional internal customs duties. This is a major advantage of locating the European entry point in Southern Europe: a company does not need to establish separate customs operations in Germany, France, Poland, etc. once its goods have entered free circulation.

For example, an Indian or Chinese company could import components into **Italy or Spain**, perform substantial manufacturing or assembly there, and then distribute the finished products across the European market. The important point is that the EU's rules of origin determine whether the resulting product can actually be considered EU-originating; merely repackaging or minimally processing an Asian product is generally insufficient

This becomes particularly interesting when Southern Europe is connected to the EU's wider Mediterranean trade network. The Pan-Euro-Mediterranean system allows, under specific conditions, **cumulation of origin** between participating countries. This can enable companies to divide production across several countries while preserving preferential treatment when the applicable rules are satisfied.

Imagine, for example, an Indian automotive company supplying batteries or components, a Moroccan plant performing part of the manufacturing process, and an Italian company completing advanced assembly and quality control. The companies could potentially create an integrated **India–Morocco–Italy–EU value chain**, provided that the applicable rules of origin and processing requirements are met.

The same concept could work for **Chinese machinery, electronics, solar equipment, pharmaceuticals, textiles, or automotive components**. Asian companies would gain proximity to the European market, while Southern European and Mediterranean economies would gain investment, manufacturing activity, logistics volumes, technology transfer, and employment.

The Middle East could add capital and logistics

The Middle East could form a second part of this network. Gulf investors and logistics companies could participate in ports, warehouses, industrial zones, energy infrastructure, and distribution networks connecting Asia with Europe.

You could therefore imagine a broader **Asia–Gulf–Mediterranean–EU corridor**:

China / India → Gulf logistics & investment hubs → Mediterranean ports → Southern Europe → EU Single Market

For example, a Chinese manufacturer could establish a European distribution and assembly operation in Italy, financed partly by a Gulf investment fund, with components arriving through Mediterranean shipping routes. An Indian technology company could similarly establish a European manufacturing or R&D base in Spain while using the Gulf as a source of capital and the Mediterranean as its logistics gateway.

This could actually be a strategic advantage for Southern Europe

This is where your argument becomes particularly interesting. **Club Med countries could position themselves not simply as the southern edge of the EU, but as Europe's gateway to Asia, the Middle East and Africa.**

Instead of trying to compete directly with Northern European industrial centers, Southern Europe could specialize in being the **interface between the EU Single Market and the wider Mediterranean–Middle Eastern–Asian economic system**.

That could create a proposition such as:

Asia provides manufacturing scale and supply chains; the Middle East provides capital and energy; the Mediterranean provides logistics and complementary production; and the EU provides regulatory stability, market access and technological capabilities.

The EU could actively encourage this by developing

Mediterranean industrial zones, port infrastructure, customs digitalization, investment incentives and common standards, while ensuring that companies undertaking genuine production and value creation in Europe or partner countries can benefit from the relevant EU trade frameworks.

The crucial policy point, however, is that the EU **should not simply become a transshipment route for Chinese and Indian goods**. The objective should be to attract **actual investment, assembly, manufacturing, R&D, logistics and joint ventures** into Southern Europe and its Mediterranean neighborhood. That is what turns a trade corridor into a European industrial strategy.

This would also give the EU a way to **onshore part of Asian production without requiring everything to be produced entirely inside Europe**—creating a more flexible Euro-Mediterranean value chain while preserving the integrity of EU customs and origin rules.

From a European market to a European economic model

A Euro-Mediterranean strategy could contribute to the development of a more **European form of capitalism** by giving European companies access to global capital, technology and markets while keeping the strategic direction of economic development within European hands. The objective would not be to become protectionist or economically self-sufficient, but to build an economy that is **open, competitive and internationally connected while remaining capable of pursuing its own political and social priorities**.

This could be particularly important because Europe has a different economic philosophy from both the United States and China. The European model places greater emphasis on social cohesion, environmental sustainability, consumer protection, competition, the rule of law, data protection and long-term economic stability. The challenge is to ensure that these values do not become a competitive disadvantage, but instead become part of Europe's economic strength.

Using globalisation to strengthen European industry

The Asia–Middle East–Mediterranean–EU model could allow Europe to use globalisation more strategically. Instead of attempting to produce everything within Europe, European companies could organise **European-led international value chains**.

For example, an electric vehicle could involve European R&D and design, components produced in several Mediterranean countries, battery materials sourced internationally, assembly in Southern Europe, and financing from European or international investors. The crucial element would be that European companies retain significant control over technology, intellectual property, standards, distribution and strategic decision-making.

This would create a form of **"open strategic autonomy"**: Europe would remain deeply integrated into the global economy but would avoid becoming excessively dependent on any single foreign power.

Turning Southern Europe into a strategic economic platform

This could also transform the economic role of Southern Europe. Spain, Italy, Greece, Portugal, Malta and Cyprus could become gateways connecting the European Single Market with North Africa, the Middle East and Asia.

Ports, logistics hubs, energy infrastructure, industrial zones and digital networks could be developed around this role. European companies could establish production and distribution centres there, while Asian and Middle Eastern companies would have incentives to invest in European operations.

The result would be more than additional trade. It could create **new European industrial ecosystems** involving European firms, foreign investors, universities, technology companies, ports, banks and public institutions.

European values could become part of the competitive model

Importantly, Europe could use access to its Single Market as a way of promoting its economic standards internationally. Companies wishing to participate in European value chains would need to operate within European requirements concerning product safety, environmental standards, labour conditions, competition, data protection and corporate governance.

This creates a form of **regulatory influence through economic integration**. Instead of imposing European values through geopolitical confrontation, Europe could make its standards attractive because access to the world's large Single Market provides a commercial incentive to adopt them.

The objective should not be to force every foreign economy to become European. Rather, European participation in global value chains would increasingly be based on **shared rules and standards**.

Developing European companies rather than simply attracting foreign companies

There is also an important difference between attracting foreign investment and developing European capitalism.

If Chinese, American or Gulf companies simply establish warehouses in Southern Europe and use them to distribute imported products, the economic benefit for Europe would be relatively limited. A much more ambitious strategy would encourage **joint ventures, technology partnerships, European R&D, local manufacturing, European supply chains and European ownership stakes**.

For example, a European company and an Indian company could jointly develop hydrogen technology; a European automotive group could partner with a Gulf investment fund to build battery infrastructure; or European and Chinese companies could establish manufacturing partnerships in Southern Europe subject to European competition, investment-screening and technology-security rules.

This would allow Europe to benefit from foreign capital and expertise **without simply becoming a market for foreign products**.

A form of capitalism based on cooperation

There is perhaps an even deeper implication. European capitalism could distinguish itself through **cooperation rather than purely national or corporate competition**.

The EU could encourage European companies to cooperate across borders on major projects while continuing to compete commercially. European firms could share infrastructure, research facilities, standards and supply chains while competing on products and services.

This could produce a European economic model based on:

competition + cooperation + social responsibility + strategic autonomy + openness to the world.

That would be particularly relevant in sectors requiring enormous investment, such as energy, AI, semiconductors, aerospace, pharmaceuticals and transport infrastructure, where no individual European country is necessarily large enough to compete globally on its own.

The broader strategic objective

Ultimately, the objective would be to move from **"European companies operating in a global economy"** toward **"a European economic ecosystem shaping the global economy."**

The EU would remain open to Chinese and Indian trade, Gulf capital, American technology and African resources, but it would increasingly determine **where investment goes, which technologies are strategic, which standards apply, how value chains are organised, and what social and environmental objectives economic activity should serve**.

In that sense, the Euro-Mediterranean model could become one component of a broader European capitalism with its own identity: **globally connected but not dependent; competitive but socially embedded; innovative but sustainable; and open to foreign capital while retaining the capacity to pursue European strategic interests.**

Summary

Creating an environment conducive to business cooperation requires the European Union to pursue a dual strategy that strengthens collaboration both within Europe and with strategic partners abroad. Internally, Europe must reduce market fragmentation, strengthen common infrastructure, encourage collaborative innovation, and deepen integration among firms operating across member states. Externally, it should develop strategic partnerships with regions such as the Middle East that offer complementary strengths in capital, energy resources, technology adoption, infrastructure investment, and rapidly growing markets. Together, these measures would create a more connected, innovative, and globally competitive European business ecosystem capable of generating sustainable growth, enhancing economic resilience, and supporting Europe's long-term strategic autonomy.

Within the EU, cooperation should move beyond traditional trade relationships and increasingly focus on the creation of cross-border industrial ecosystems. Rather than competing as isolated national champions, European firms should be encouraged to collaborate in the development of technologies, infrastructure, and value chains that require scale and long-term investment. For example, European companies from several member states could jointly develop next-generation battery manufacturing facilities, bringing together raw material suppliers, technology developers, manufacturers, and recycling specialists into integrated European value chains. Similar collaborative models could be applied to semiconductors, artificial intelligence, aerospace technologies, quantum computing, advanced healthcare

solutions, and sustainable mobility systems.

The clean energy transition offers particularly strong opportunities for cooperation. European energy producers, industrial manufacturers, infrastructure operators, and technology companies could work together on large-scale renewable energy projects, offshore wind farms, smart electricity grids, and hydrogen networks that span multiple countries. A coordinated European hydrogen economy, for instance, could involve electrolyzer manufacturers in Germany, renewable energy producers in Spain and Portugal, logistics providers in the Netherlands, and industrial consumers across Central Europe. Such projects would not only strengthen industrial competitiveness but also contribute to energy security and decarbonization objectives.

The EU should also encourage collaborative innovation platforms where firms, universities, research institutes, and investors jointly develop commercially viable technologies. Instead of funding isolated research projects, European programs could prioritize consortia that bring together companies of different sizes and from different member states around clearly defined industrial objectives. Examples include collaborative AI development platforms, European cloud infrastructure initiatives, cybersecurity alliances, and cross-border digital health ecosystems. These initiatives would facilitate knowledge sharing, reduce duplication of effort, and accelerate the commercialization of research outcomes.

Small and medium-sized enterprises should be fully integrated into these cooperative frameworks. Many SMEs possess highly specialized expertise but lack access to international networks. The EU could support digital matchmaking platforms, sector-specific business clusters, and joint procurement initiatives that allow smaller firms to participate in larger projects. For example, groups of SMEs from different countries could jointly bid for public contracts, collaborate on export opportunities, or develop shared technological solutions that would otherwise be beyond their individual capacities.

Beyond Europe, strategic cooperation with the Middle East presents significant opportunities for mutually beneficial business partnerships. Gulf countries are implementing ambitious economic diversification strategies and investing heavily in sectors that align closely with European strengths. This creates fertile ground for collaborative projects that combine European technology and expertise with Middle Eastern capital, infrastructure development ambitions, and growing domestic markets.

One promising area is green hydrogen. European energy technology firms could partner with Gulf energy companies to develop large-scale hydrogen production facilities powered by abundant solar resources. Hydrogen produced in the Gulf could then be exported to Europe through dedicated supply chains, supporting Europe's energy transition while creating new industrial opportunities for both regions. Such projects would require collaboration between renewable energy developers, infrastructure operators, engineering firms, logistics providers, and industrial consumers.

Artificial intelligence and digital infrastructure represent another area of strong potential. European software developers, semiconductor firms, cloud service providers, and research institutions could cooperate with Gulf investors and technology hubs to establish AI innovation centers, data centers, and advanced computing facilities. Joint ventures could focus on applications in healthcare, finance, smart cities, logistics, and public services, creating benefits for both European and Middle Eastern economies.

The development of sustainable cities provides another example of business cooperation with significant potential. European engineering firms, mobility providers, construction companies, and environmental technology specialists could participate in major urban development projects across the Middle East. Initiatives related to smart transportation systems, energy-efficient buildings, water management technologies, and circular economy solutions would allow European firms to showcase their expertise while supporting regional development goals.

Supply chain cooperation should also be expanded. Joint investments in ports, logistics corridors, industrial zones, and digital trade infrastructure could strengthen connectivity between Europe and the Middle East. European manufacturers could establish partnerships with regional logistics operators and industrial investors to create more resilient and diversified supply chains. This would reduce vulnerabilities associated with excessive dependence on a limited number of suppliers while opening new market opportunities.

In addition, the EU should facilitate the creation of sector-specific business cooperation forums that bring together companies, investors, research organizations, and policymakers. These platforms could focus on strategic sectors such as clean energy, advanced manufacturing, life sciences, aerospace, food security, and digital technologies. By creating structured opportunities for dialogue and project development, such forums would help transform political partnerships into concrete commercial collaborations.

Ultimately, the goal should be to shift from a model based primarily on trade transactions toward one based on long-term industrial partnerships and joint value creation. Whether through European battery alliances, cross-border hydrogen networks, AI innovation ecosystems, smart city partnerships, or joint infrastructure investments with the Middle East, cooperation enables firms to pool resources, share risks, access new markets, and accelerate innovation. By actively supporting these forms of collaboration, the European Union can foster a business environment in which cooperation becomes a source of competitive advantage, economic resilience, and sustainable prosperity both within Europe and beyond its borders.

Coupling the Analytical Framework to the Research Gap

The preceding analysis suggests that the externalisation of EU industrial policy cannot be adequately understood through a conventional distinction between domestic industrial policy and external economic relations. Rather, the two have become increasingly intertwined. The central analytical implication is that EU industrial policy should be understood as a multi-level process of external policy projection, through which internally defined objectives concerning competitiveness, resilience, sustainability, technological capacity, and economic security are translated into instruments that shape actors and markets beyond the EU's territorial jurisdiction.

This interpretation builds upon, but also extends, the literature on EU regulatory power and the Brussels Effect. The regulatory-power perspective explains how the EU can influence external actors through the attractiveness and scale of its internal market (Bradford, 2020). The literature on the EU as a trade power similarly demonstrates how collective European market power can be converted into external bargaining capacity (Meunier & Nicolaïdis, 2006). Meanwhile, the concept of weaponized interdependence draws attention to the strategic possibilities created by states' and institutions' positions within global economic networks (Farrell & Newman, 2019). Taken together, these perspectives provide important foundations for understanding the external reach of EU economic governance. However, they do not fully explain the contemporary transformation of industrial policy, in which regulation, trade, investment, technology, environmental governance, and economic security increasingly operate as mutually reinforcing components of a single strategic project.

The analytical framework advanced here therefore conceptualises externalisation through three interconnected dimensions: projection, dependence, and strategic reconfiguration. First, *projection* captures the mechanisms through which EU rules, standards, market-access conditions, and policy preferences affect actors outside the Union. The Brussels Effect is particularly relevant at this level because the EU can externalise regulatory preferences without relying upon direct coercion. Second, *dependence* captures the vulnerabilities generated by global value chains and asymmetric economic interdependence. The EU's recognition that industrial competitiveness depends upon access to external technologies, resources, components, and markets means that industrial policy must increasingly address the structure of these dependencies. Third, *strategic reconfiguration* concerns the deliberate attempt to alter those dependencies through diversification, domestic capacity-building, international partnerships, trade instruments, and regulatory intervention.

This three-dimensional framework allows the externalisation of industrial policy to be understood as more than a one-directional export of EU regulation. Externalisation is simultaneously constitutive and adaptive. The EU projects its regulatory and industrial preferences outward, but it also modifies its internal policies in response to vulnerabilities and pressures originating in the international political economy. Globalisation therefore does not merely provide the environment within which EU industrial policy operates; it actively reshapes the content and objectives of that policy. The external and internal dimensions of industrial policy are consequently mutually constitutive.

This perspective also identifies an important gap in the existing literature. Much of the scholarship on EU external economic power has concentrated on the Union's ability to export rules, exercise market power, or negotiate trade agreements. By contrast, the emerging literature on European industrial policy has tended to focus on internal competitiveness, strategic autonomy, state aid, industrial capacity, and the green and digital transitions. These literatures remain insufficiently integrated. The former explains how the EU exercises power externally, while the latter explains why the EU is increasingly intervening in industrial markets internally. What remains less fully theorised is how the transformation of internal industrial policy itself generates new forms of external power and, conversely, how external dependencies reshape the Union's industrial-policy objectives.

The research gap is therefore not simply empirical but analytical. Existing approaches risk treating EU industrial policy and EU external economic policy as analytically separate domains. Such a separation becomes increasingly problematic as industrial-policy instruments acquire explicit external objectives. The Critical Raw Materials Act,

the European Chips Act, the Carbon Border Adjustment Mechanism, trade-defence instruments, investment screening, and economic-security initiatives illustrate a policy environment in which the boundaries between internal market governance and external relations are increasingly blurred. These instruments are directed simultaneously towards domestic economic objectives and the international configuration of markets, supply chains, technologies, and production networks.

The analytical contribution of this perspective is consequently to treat externalisation as a mechanism linking internal capacity-building to external power projection. The EU does not acquire greater external influence solely because it regulates foreign actors; it also acquires influence when it restructures the economic capabilities and dependencies upon which its external relationships rest. Industrial policy thus becomes a source of external power in its own right. Strengthening European production capacity, diversifying supply chains, controlling strategic technologies, and establishing regulatory standards can alter the bargaining position of the Union within global economic networks.

This argument further suggests that the externalisation of industrial policy should not be equated with protectionism or economic closure. Strategic autonomy is better understood as an attempt to govern interdependence rather than eliminate it. The objective is to determine which forms of external dependence are acceptable, which constitute strategic vulnerabilities, and which can be mitigated through diversification or the development of European capabilities. This distinction is analytically important because it explains why contemporary EU industrial policy combines apparently contradictory tendencies: market openness alongside intervention, international cooperation alongside de-risking, and global integration alongside efforts to strengthen domestic capacity.

The resulting analytical proposition can therefore be stated as follows: the greater the perceived strategic vulnerability of European industrial capabilities, the more likely the EU is to externalise industrial policy through a combination of regulatory projection, market-access conditionality, international economic partnerships, and measures designed to restructure external dependencies. Externalisation is consequently both an instrument of power and a response to vulnerability. This dual character distinguishes contemporary EU industrial policy from earlier approaches centred primarily on market liberalisation and competitiveness.

The chapter thus contributes to closing the analytical gap between the literatures on EU regulatory power, external economic governance, and industrial policy. It conceptualises the EU not simply as a regulator that exports rules, nor merely as a market power negotiating favourable trade conditions, but as an industrial-strategic actor whose internal economic policies increasingly constitute instruments of external power. This reconceptualisation provides a basis for examining how the EU translates domestic industrial objectives into external strategies and how international interdependence, in turn, transforms the substance of European industrial policy.

The EU's industrial strategy can be organised around three categories:

Europe should produce itself where the industry is strategically important for **security, technological sovereignty and resilience**. This includes semiconductors, defence equipment, pharmaceuticals, critical digital infrastructure, batteries and some clean technologies.

Europe should produce with partners where production requires resources, energy or capabilities that Europe cannot efficiently provide alone. This includes critical raw materials, energy-intensive industries and some components, using trusted partners such as Norway, Canada, Australia and selected countries in Africa and Latin America.

Europe can safely import goods that are **non-strategic, widely available and easily substitutable**, particularly where producing them in Europe would be significantly more expensive without improving security or resilience. This could include many consumer goods, basic manufactured products and some standard components.

The key principle is **not autarky**: Europe should retain control over strategically important capabilities, diversify critical dependencies through partnerships, and continue importing products where dependence does not create a major economic or security vulnerability.

The broader implication is that the externalisation of EU industrial policy represents a qualitative change in the political economy of European integration. Industrial policy is no longer confined to the question of how the Union organises production within its borders. It increasingly concerns how Europe positions itself within global production networks, how it manages asymmetric dependencies, how it shapes international standards, and how it converts economic capabilities into strategic influence. The analytical task, therefore, is to move beyond a binary distinction between *internal* industrial policy and *external* economic policy and instead examine the

mechanisms through which these two dimensions increasingly operate as parts of a single European strategy of strategic economic governance.

Europe should not seek to withdraw from US-led globalisation, but to shape it on European terms. By connecting the EU Single Market with the productive capacities of the Mediterranean, the capital of the Middle East and the industrial and technological capabilities of Asia, Europe could build a more open but strategically autonomous economic model—one in which globalisation becomes a means of strengthening European capitalism rather than a process that progressively weakens it.

We shape them, they shape us.

10. Case Study: The Four Pivots — Kazakhstan, Brazil, Nigeria and Chile

The externalisation of EU industrial policy becomes most visible when examined through the concrete partnerships through which the Union seeks to reshape its position within global production networks. Kazakhstan, Brazil, Nigeria, and Chile provide four particularly useful cases because they represent different geographical, economic, and strategic configurations through which European industrial interests are projected externally. They should not be understood merely as examples of EU development cooperation or conventional trade diplomacy. Rather, they constitute distinct pivots in the emerging architecture of European strategic economic governance.

The four cases illuminate different dimensions of the analytical framework developed above. Kazakhstan represents a resource and connectivity pivot, through which the EU seeks to diversify critical raw-material supplies while simultaneously developing transport, energy, hydrogen, and battery value chains. Brazil represents a scale and value-chain pivot, in which the EU engages a major industrial and agricultural economy with significant potential in critical raw materials, clean technology, sustainable infrastructure, and digital connectivity. Nigeria represents a market, energy, and productive-capacity pivot, where European external industrial interests intersect with digital transformation, energy transition, infrastructure, and local manufacturing. Chile, finally, represents a green-technology and strategic-resource pivot, particularly through lithium, copper, renewable hydrogen, and the development of sustainable value chains.

The cases therefore allow the central proposition of this chapter to be examined comparatively: EU industrial policy is increasingly externalised through partnerships that simultaneously secure European strategic interests and seek to restructure productive capacities in partner countries. This process is neither exclusively extractive nor purely developmental. Instead, it produces a form of negotiated interdependence in which European objectives concerning resilience and diversification intersect with partner-country ambitions for industrial upgrading, investment, infrastructure, and value addition.

1. Kazakhstan: The Resource and Connectivity Pivot

Kazakhstan provides perhaps the clearest illustration of the EU's attempt to connect industrial policy with geopolitical diversification. The country occupies a strategically important position between Europe and Asia and possesses substantial reserves of minerals and other raw materials relevant to the green and digital transitions. For the EU, Kazakhstan therefore represents both a source of critical materials and a potential alternative node within increasingly contested Eurasian supply chains.

The EU-Kazakhstan relationship has developed significantly beyond conventional trade. The Enhanced Partnership and Cooperation Agreement established a broad framework for economic relations, including cooperation concerning raw materials and energy. More importantly for the externalisation of industrial policy, the EU and Kazakhstan signed a Strategic Partnership on Sustainable Raw Materials, Batteries and Renewable Hydrogen Value Chains in November 2022. The partnership explicitly links access to raw materials with the development of sustainable value chains and industrial capabilities.

Kazakhstan consequently illustrates the first mechanism of externalisation: strategic diversification through value-chain integration. The EU is not simply seeking to purchase minerals from Kazakhstan. The partnership envisages cooperation across extraction, processing, batteries, renewable hydrogen, technology, skills, and sustainability. This is consistent with the Critical Raw Materials Act's broader objective of reducing excessive dependence on individual third countries while developing more diversified international partnerships.

The Kazakhstan case is particularly important because it demonstrates how external industrial policy responds simultaneously to *dependence* and *connectivity*. The EU's interest in Kazakh resources is inseparable from the physical infrastructure through which those resources can reach European markets. Global Gateway therefore places Kazakhstan within a broader framework encompassing critical raw materials, renewable energy, digital

connectivity, and the Trans-Caspian Transport Corridor. The EU is consequently attempting to create not merely a supplier relationship but a more resilient economic corridor connecting European industrial demand to Central Asian production.

Analytically, Kazakhstan therefore represents a transition from resource diplomacy to industrial-chain diplomacy. The EU's objective is increasingly to shape the structure of production around strategic resources rather than simply secure access to commodities. This corresponds closely to the concept of externalisation developed in this chapter: internal European objectives concerning resilience and strategic autonomy generate external interventions designed to modify production, infrastructure, investment, and regulatory conditions in a partner country.

At the same time, the case exposes a central tension. Kazakhstan's exports to the EU remain heavily concentrated in mineral products, oil, gas, and uranium, with the European Commission noting that mineral products account for roughly 90% of Kazakhstan's exports to the EU. The challenge is therefore whether EU engagement can facilitate genuine industrial upgrading and diversification in Kazakhstan or whether the partnership will reproduce a commodity-based division of labour. This tension is analytically significant because it provides a test of whether EU externalisation produces shared value-chain integration or merely secures European access to upstream resources.

2. Brazil: The Scale and Value-Chain Pivot

Brazil represents a different form of externalisation. Unlike Kazakhstan, its significance does not derive primarily from its position as a supplier of a narrow range of strategically important minerals. Brazil possesses a much broader industrial, agricultural, technological, and energy base and is one of the world's largest economies. Its importance for EU industrial policy therefore lies in the combination of market scale, productive capacity, natural resources, and potential for green industrial transformation.

Brazil illustrates a second form of externalisation: the attempt to connect European industrial objectives to large and diversified production ecosystems. The EU's engagement with Brazil increasingly encompasses critical raw materials, clean energy, sustainable transport, digital infrastructure, and investment. In June 2026, the European Commission's Global Gateway investment mission to Brazil explicitly focused on critical raw materials, sustainable transport, digital technology, and clean energy, while seeking to translate the broader EU-Brazil relationship into concrete investment projects.

Brazil is therefore particularly relevant to the analytical concept of strategic reconfiguration. Whereas Kazakhstan primarily addresses the diversification of supply, Brazil offers the possibility of developing alternative production and processing capacities at a much larger scale. This makes Brazil significant not simply as an external supplier but as a potential co-producer within emerging green and digital value chains.

The Brazilian case also illustrates the importance of market size in the externalisation of EU industrial policy. The EU's relationship with Brazil is not reducible to securing resources for European industry. It also involves access to a large consumer and investment market and the possibility of coordinating industrial transformation through trade and investment frameworks. The interaction between the EU-Mercosur relationship and Global Gateway is therefore analytically important: trade liberalisation and industrial strategy increasingly operate in conjunction rather than as separate policy domains.

This case also introduces an important element absent from a narrow resource-security interpretation of EU industrial policy. The externalisation process can be bidirectional. European firms seek investment and market opportunities in Brazil, while Brazilian actors seek European capital, technology, infrastructure, and market access. The resulting relationship is therefore potentially more symmetrical than conventional raw-material partnerships.

Nevertheless, the asymmetry in technological and financial capabilities should not be overlooked. European investment and regulatory standards may shape the direction of Brazilian industrial development, particularly in sectors such as green hydrogen, sustainable mining, digital infrastructure, and low-carbon production. Brazil thus demonstrates how the externalisation of EU industrial policy can operate through investment-led regulatory and technological influence, rather than solely through trade conditionality.

3. Nigeria: The Market, Energy and Productive-Capacity Pivot

Nigeria represents a third and substantially different pivot. Its importance to EU industrial policy is less directly connected to critical raw materials than that of Kazakhstan or Chile. Instead, Nigeria's significance lies in its demographic scale, expanding market, energy potential, digital economy, infrastructure needs, and position within the African economy.

The Nigerian case therefore allows the analytical framework to move beyond the idea that externalised industrial policy is principally a mechanism for securing resources. Here, externalisation operates through market formation and productive-capacity development. The EU's Global Gateway framework explicitly identifies Nigeria as a partner for digital economy initiatives, alongside broader efforts to strengthen economic connectivity and investment in partner countries.

Nigeria illustrates the proposition that industrial resilience cannot be achieved solely through securing physical inputs. European competitiveness increasingly depends on access to digital infrastructure, new markets, energy systems, logistics networks, and technologically capable partner economies. External industrial policy therefore encompasses the creation of the wider ecosystems within which European firms can operate.

This makes Nigeria particularly important for understanding the relationship between industrial policy and development policy. The EU's external economic engagement is increasingly framed around investment that is intended to generate productive capacity in partner countries while simultaneously advancing European strategic interests. Global Gateway is explicitly designed around this logic of mutually beneficial investment. The European Commission's economic-security strategy similarly identifies Global Gateway as a mechanism through which partner-country economic security and EU strategic interests can be advanced simultaneously.

Nigeria consequently represents a form of externalisation in which the EU seeks to influence the conditions of market emergence rather than simply secure access to an existing commodity supply chain. Digitalisation, energy infrastructure, connectivity, skills, and productive capacity become industrial-policy concerns because they determine whether partner economies can participate effectively in global value chains.

Yet this case also presents the sharpest challenge to the idea that externalisation automatically produces European strategic gains. Nigeria has its own industrial-development objectives, political priorities, and development constraints. European interventions must therefore operate through negotiation rather than unilateral regulatory projection. The Nigerian case demonstrates that externalisation is not simply something the EU *does to* external actors. It is a process shaped by bargaining, domestic institutions, partner-country preferences, and the distribution of economic capabilities.

4. Chile: The Green-Technology and Strategic-Resource Pivot

Chile provides perhaps the most developed example of the relationship between critical raw materials and the green transition. Its importance to EU industrial policy is closely associated with lithium and copper, both of which are central to emerging clean-energy and digital technologies. The EU established a strategic raw-materials partnership with Chile in 2023, while the modernised EU-Chile trade framework provides an institutional foundation for deeper economic cooperation.

Chile is particularly significant because the EU's approach explicitly seeks to move beyond simple extraction. The Global Gateway initiative concerning Chile and Argentina aims to develop lithium and copper value chains while incorporating research and development, environmental and social governance, infrastructure, and skills development. This represents an important evolution in the EU's external industrial strategy: the objective is not merely to secure access to raw materials but to encourage value-chain development and sustainable industrial upgrading in partner countries.

Chile therefore provides a strong empirical illustration of the concept of strategic reconfiguration. European policy seeks to alter the configuration of global value chains by diversifying supply, increasing processing capabilities, improving infrastructure, and creating stronger institutional links between European and Chilean producers.

The green-hydrogen dimension reinforces this argument. The EU's Global Gateway agenda includes cooperation with Chile on developing a renewable hydrogen economy, connecting European demand for low-carbon energy and technologies with Chile's renewable-energy potential. The relationship thus extends across several stages of industrial transformation: raw materials, energy, technology, infrastructure, investment, and trade.

The Chilean case nevertheless raises a fundamental question about the politics of value addition. If European industrial policy succeeds in securing stable supplies of lithium and copper but leaves high-value processing and technology largely concentrated outside Chile, the partnership may reproduce an unequal structure of global production. Conversely, if European investment, technology transfer, infrastructure, and skills programmes contribute to Chilean downstream capacity, the partnership could represent a more genuinely integrated model of industrial development.

Chile therefore serves as an important test of the EU's claim that external industrial policy can be both strategically beneficial and mutually developmental.

5. Comparative Analysis: Four Pivots, One Externalisation Strategy

Taken together, the four cases demonstrate that the externalisation of EU industrial policy is not a uniform process. It operates through different mechanisms depending on the economic structure and strategic position of the partner country.

Table

Pivot	Primary EU interest	Principal mechanism	Analytical dimension
Kazakhstan	Critical raw materials, batteries, hydrogen, connectivity	Strategic partnership and infrastructure integration	Dependence and diversification
Brazil	Large market, resources, green industry, investment	Trade and Global Gateway investment	Strategic reconfiguration
Nigeria	Digital economy, energy, infrastructure, market development	Investment and productive-capacity building	Market formation
Chile	Lithium, copper, hydrogen, green technologies	Strategic partnership and value-chain development	Value-chain integration

The comparative evidence suggests that the four cases correspond to different stages of the same externalisation process. Kazakhstan addresses vulnerability at the upstream level; Chile connects upstream resources to green industrial transformation; Brazil provides scale and diversified production capacity; and Nigeria illustrates the construction of new markets and productive ecosystems. The cases therefore collectively reveal an EU strategy that operates across the entire value chain rather than at the level of resource procurement alone.

This is significant for the analytical framework because it demonstrates that the three dimensions of externalisation—projection, dependence, and strategic reconfiguration—do not operate independently. In Kazakhstan, European regulatory and investment preferences are projected into a strategic resource relationship designed to reduce European dependence. In Chile, this process extends into the restructuring of green-technology value chains. In Brazil, European investment and trade relationships seek to connect large-scale productive capacities to European industrial and environmental objectives. In Nigeria, the emphasis shifts towards market formation, connectivity, and productive capacity.

The four pivots consequently demonstrate that externalisation should be conceptualised as a relational process of value-chain governance. The EU seeks to modify external production structures, but the nature of this intervention depends upon the capabilities, resources, institutions, and strategic interests of partner countries. The resulting relationships are neither purely hierarchical nor entirely symmetrical. They are structured by asymmetries of market power, technology, capital, resources, and regulatory capacity, while simultaneously depending upon cooperation with external actors.

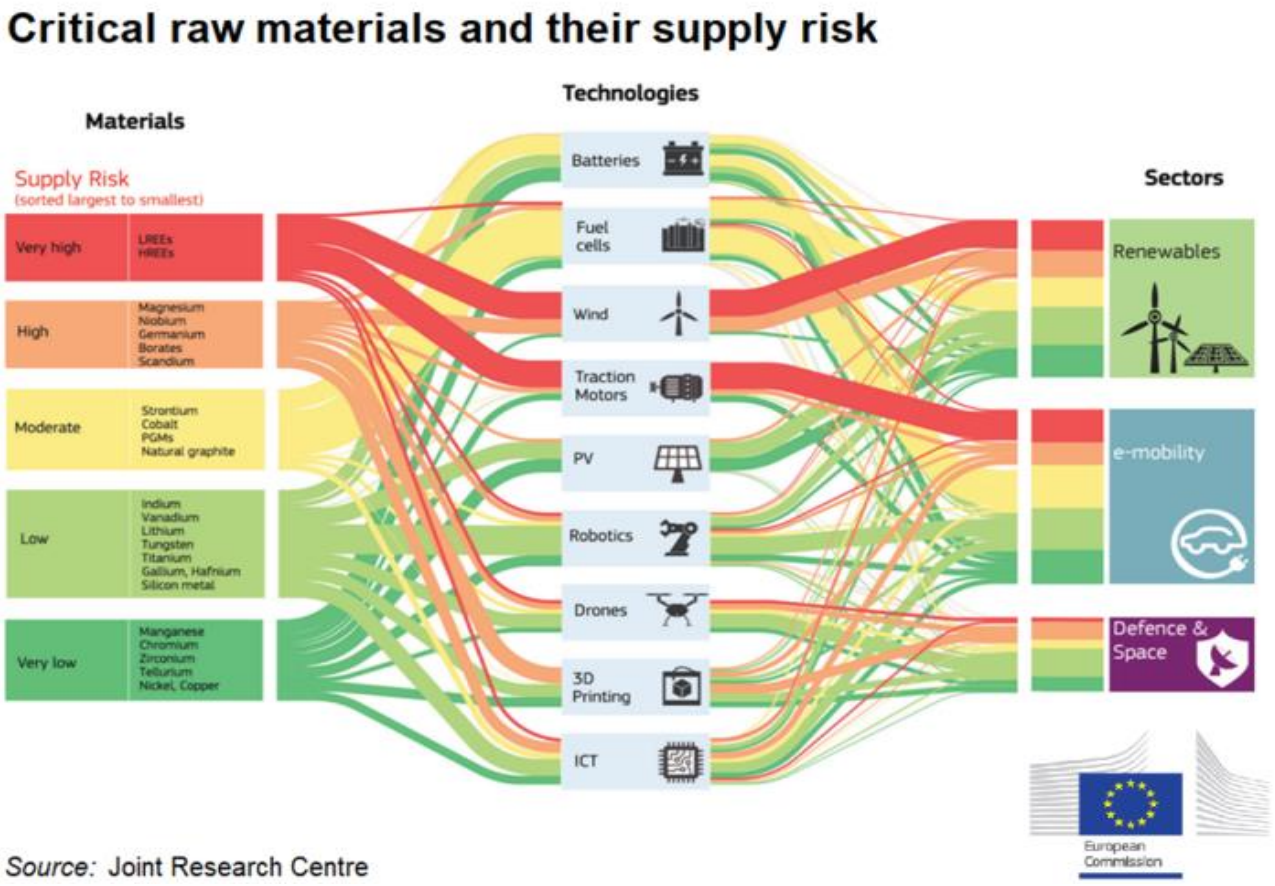
EU Critical Raw Materials Diplomacy and Strategic Partnerships

The emergence of **Critical Raw Materials (CRM) diplomacy** marks an important transformation in the

external dimension of EU industrial policy. Critical raw materials are no longer treated simply as commodities that European firms can acquire through conventional international trade. They have become strategic inputs into the EU's green, digital, defence, aerospace, and advanced-manufacturing ambitions. The European Commission identifies 34 critical raw materials, of which 17 are classified as strategic raw materials because of their particular importance to strategic technologies and the vulnerability of their supply chains. (RMIS - Raw Materials Information System) This development reflects a broader shift from a predominantly market-oriented conception of resource security towards a **geoeconomic approach in which access to minerals, processing capacity, technology, infrastructure, and investment is treated as an element of industrial resilience and strategic autonomy**.

The institutional foundation for this shift is the **European Critical Raw Materials Act (CRMA)**, which entered into force in May 2024. The Act seeks to strengthen the entire European CRM value chain while diversifying external sources of supply. Its 2030 benchmarks include EU extraction meeting at least 10% of annual consumption, processing at least 40%, recycling at least 25%, and limiting dependence on any single third country to no more than 65% of annual consumption of each strategic raw material. (Internal Market and SMEs) These targets reveal an important analytical point: the EU's objective is not autarky. Rather, it is the **reconfiguration of dependence** through a combination of domestic capacity-building, recycling, diversification of imports, and deeper relationships with resource-rich partners.

Figure



This is where CRM diplomacy becomes central to the externalisation of EU industrial policy. The European Commission explicitly identifies raw-materials diplomacy as one of the pillars of its raw-materials strategy, using strategic partnerships and policy dialogues with non-EU countries to secure access to global resources. (Internal Market and SMEs) Strategic partnerships are therefore not conventional diplomatic arrangements alone; they constitute institutional mechanisms through which the EU seeks to connect its internal industrial requirements with production and investment opportunities abroad. They provide a framework for cooperation across exploration, extraction, processing, recycling, research, innovation, skills, infrastructure, and sustainability, thereby extending the scope of EU industrial governance beyond its territorial boundaries.

The significance of these partnerships lies precisely in their **value-chain orientation**. The EU is increasingly seeking to avoid a relationship in which partner countries simply export unprocessed minerals to European markets. The Commission's more recent approach explicitly emphasises local beneficiation, value creation, and employment in partner countries, recognising that sustainable partnerships require partners to develop capabilities beyond extraction. (Internal Market and SMEs) This creates a potentially important distinction between traditional resource diplomacy and contemporary CRM diplomacy. The former is primarily concerned with securing supplies; the latter seeks to shape the **organisation of production, processing, investment, and technological upgrading across borders**.

CRM diplomacy therefore provides a particularly clear empirical expression of the analytical concept of externalisation developed in this chapter. The EU's internal industrial objectives—resilience, competitiveness, decarbonisation, digitalisation, and strategic autonomy—generate external policy interventions directed towards third-country production systems. At the same time, these external partnerships feed back into European industrial policy by determining which sources of supply are considered reliable, which technologies and projects receive support, and which value chains become strategically prioritised. Externalisation is consequently **bidirectional**: European industrial policy projects preferences outward while external dependencies reshape the content of European industrial strategy.

The strategic partnerships with **Kazakhstan and Chile** provide particularly clear illustrations of this logic. Kazakhstan became an EU strategic partner in November 2022 through a Memorandum of Understanding covering sustainable raw materials, batteries, and renewable hydrogen value chains. The partnership seeks to develop secure and sustainable supplies of raw and refined materials while connecting them to downstream industrial activities relevant to Europe's green and digital transitions. (Trade and Economic Security) Chile followed in July 2023 with a strategic partnership focused on sustainable raw-material value chains, particularly relevant to lithium and copper. The relationship is embedded within wider EU-Chile cooperation on renewable energy, green jobs, and sustainable development. (International Partnerships)

The institutional architecture has subsequently expanded considerably. The Commission's current raw-materials diplomacy framework lists strategic partnerships with Argentina, Australia, Canada, Chile, the Democratic Republic of the Congo, Greenland, Kazakhstan, Namibia, Norway, Rwanda, Serbia, South Africa, Ukraine, Uzbekistan, and Zambia, while maintaining additional raw-materials relations with countries and regional groupings including Brazil, China, Colombia, Japan, Mexico, Peru, Uruguay, the Euro-Mediterranean countries, and the African Union. (Internal Market and SMEs) By 2025, the Commission described the EU as having fifteen strategic raw-material partnerships and emphasised that these partnerships should create local added value and jobs rather than remain confined to extraction.

This distinction is particularly useful for the four-pivot case study. **Chile and Kazakhstan can be treated as formal CRM strategic-partnership cases**, while **Brazil represents an expanding CRM engagement embedded within a broader strategic economic relationship**, and **Nigeria functions as a contrasting case in which the externalisation of industrial policy operates more strongly through energy, infrastructure, connectivity, digitalisation, and productive capacity than through a formal bilateral CRM partnership**. The analytical value of this variation is considerable because it prevents the study from assuming that all external industrial relationships operate through the same institutional mechanism.

Brazil is especially significant because it demonstrates how CRM diplomacy is becoming embedded within broader industrial and investment relations. Current EU-Brazil cooperation includes joint investment in lithium, nickel, and rare earths, alongside climate, energy, digital, and infrastructure initiatives. (International Partnerships) Brazil therefore represents a case in which CRM diplomacy intersects with the scale and complexity of a major emerging industrial economy. Rather than simply securing access to resources, the EU has an interest in developing processing, investment, clean-energy, and technology linkages that can connect Brazilian productive capabilities to European value chains.

Nigeria, by contrast, helps establish the analytical boundaries of CRM diplomacy. It is not currently listed among the EU's formal strategic raw-material partnerships. (Internal Market and SMEs) Nevertheless, Nigeria remains relevant to the externalisation of industrial policy because EU engagement encompasses infrastructure, energy, digitalisation, connectivity, investment, and productive capacity. This makes Nigeria a useful **contrast case**: it demonstrates that the externalisation of industrial policy extends beyond the narrow question of securing critical minerals and encompasses the wider economic ecosystems upon which industrial competitiveness depends.

The development of CRM diplomacy should therefore be

understood as part of a broader transition from **trade interdependence towards managed strategic interdependence**. The EU continues to rely upon international markets, but it increasingly seeks to influence the geographical distribution of extraction, processing, infrastructure, technology, and investment within those markets. Global Gateway reinforces this approach by providing financial, technical, and infrastructure support for projects in partner countries, including projects along CRM value chains. The CRMA itself explicitly identifies strategic partnerships, trade agreements, and Global Gateway as complementary instruments for diversifying supply and developing resilient international value chains. (Internal Market and SMEs)

The analytical significance of CRM diplomacy consequently extends beyond resource security. It represents a mechanism through which the EU attempts to convert its market, regulatory, financial, and technological capabilities into **external industrial influence**. The central question is therefore not simply whether the EU can secure sufficient supplies of lithium, copper, rare earths, or other strategic materials. Rather, it is whether European partnerships can restructure global value chains in ways that simultaneously reduce European vulnerabilities and generate meaningful productive upgrading in partner economies.

This raises an important tension at the heart of the EU's external industrial strategy. On the one hand, diversification can reduce excessive dependence and enhance European resilience. On the other, an EU strategy centred primarily on securing access to upstream resources could reproduce precisely the asymmetrical value-chain relationships that the new partnership model claims to overcome. The Commission's emphasis on local beneficiation and value creation can therefore be interpreted as an attempt to address this contradiction by linking European supply security to partner-country industrial development. (Internal Market and SMEs)

The four cases of **Chile, Brazil, Kazakhstan, and Nigeria** consequently allow CRM diplomacy to be analysed not as an isolated policy instrument but as part of a broader process of **externalised industrial governance**. Chile and Kazakhstan illustrate formal resource partnerships designed to integrate external resources with European strategic value chains; Brazil demonstrates how CRM engagement can be embedded within a large-scale industrial and investment relationship; and Nigeria provides a counterpoint showing how the same logic of strategic economic engagement can operate without a formal CRM partnership. Taken together, the cases provide a basis for assessing whether EU externalisation is primarily a strategy of **resource acquisition, supply-chain diversification, value-chain upgrading, or the broader governance of strategic interdependence**.

The crucial analytical question that follows is therefore: **does EU CRM diplomacy merely diversify where Europe obtains critical inputs, or does it enable the EU to reshape the international organisation of production in ways that generate both European resilience and partner-country industrial upgrading?** Answering this question places CRM diplomacy directly at the centre of the chapter's broader argument concerning the externalisation of EU industrial policy.

Cross-Tabulation: EU CRM Diplomacy and the Four Pivots

The comparative framework below operationalises the relationship between EU Critical Raw Materials (CRM) diplomacy and the four country cases. It distinguishes the **institutional form of EU engagement**, the **strategic resource dimension**, the **value-chain objective**, and the wider mechanism through which industrial policy is externalised.

Analytical dimension	Chile	Brazil	Kazakhstan	Nigeria
EU CRM relationship	Formal strategic partnership on sustainable raw-material value chains	Expanding CRM engagement within broader EU-Brazil strategic and investment relations	Formal strategic partnership on sustainable raw materials, batteries and renewable hydrogen	No formal bilateral CRM strategic partnership; broader strategic economic engagement
Position in EU CRM diplomacy	Core strategic partner	Emerging/expanding partner	Core strategic partner	Contrast case outside formal CRM partnership architecture

Key strategic resources	Lithium, copper	Rare earths, niobium, nickel, graphite, lithium, manganese, aluminium	Critical minerals and metals relevant to batteries, hydrogen and clean technologies	Limited role as a formal CRM supplier; greater relevance to energy, infrastructure and market development
Primary EU concern	Diversification of lithium and copper supply	Diversification and development of alternative CRM value chains	Reduction of concentrated external dependencies	Development of resilient markets, energy systems and productive ecosystems
Main industrial-policy objective	Secure supply while developing sustainable downstream value chains	Connect Brazilian industrial capacity and resources with European value chains	Integrate resource extraction with processing, batteries and hydrogen	Strengthen productive capacity, connectivity, energy and digital infrastructure
Externalisation mechanism	Strategic partnership + investment + value-chain integration	Investment + trade + industrial cooperation + CRM diplomacy	Strategic partnership + infrastructure + investment	Global Gateway + investment + infrastructure + energy/digital cooperation
Value-chain approach	Extraction → processing → technology → green industries	Extraction → processing → manufacturing → European market integration	Extraction → processing → batteries/hydrogen	Infrastructure → energy/digital capacity → market formation → industrial development
Infrastructure role	Logistics, energy, ports and infrastructure supporting mineral value chains	Transport, digital connectivity, clean energy and industrial infrastructure	Trans-Caspian connectivity, logistics, energy and industrial infrastructure	Energy, transport, digital connectivity and infrastructure
Technology and skills	Research, processing technology, skills and sustainable mining	Processing technologies, industrial know-how and investment	Mining, processing, battery/hydrogen technologies and skills	Digital, energy and productive-capacity development
ESG/sustainability dimension	Strong and explicitly embedded in CRM partnership	Increasingly central to investment and CRM engagement	Explicitly incorporated into sustainable resource and industrial cooperation	Embedded primarily through broader Global Gateway and development cooperation
Partner-country objective	Increase local value addition and develop green industries	Attract investment and strengthen domestic processing and industrial capacity	Diversify the economy and move towards downstream processing	Industrialisation, employment, infrastructure and economic diversification
European dependency addressed	Concentrated global supply of lithium and copper	Concentrated global CRM extraction and processing	Dependence on external strategic minerals and supply routes	Wider economic and energy dependencies rather than primarily CRM dependence

Partner-country bargaining capacity	Relatively high due to strategic mineral resources	High due to market size, resource base and industrial capacity	Significant due to resources and geopolitical location	High in selected sectors, but constrained by infrastructure and institutional capacity
Risk of dependency reproduction	Medium–high if downstream processing remains limited	Medium	High if extraction dominates value creation	Different form: financial, technological and infrastructural dependency
Expected European gain	Supply diversification and green-transition inputs	Diversified CRM supplies, markets and industrial partnerships	Resilient resource and energy value chains	New markets, investment opportunities, connectivity and productive ecosystems
Expected partner-country gain	Investment, technology, processing and employment	Capital, technology, processing capacity and market access	Infrastructure, technology, downstream industrialisation	Infrastructure, energy, digitalisation, skills and productive capacity
Primary analytical pivot	**Green-transition/value-chain pivot**	**Scale and industrial-processing pivot**	**Resource-diversification/connectivity pivot**	**Market/productive-capacity pivot**
Dominant analytical dimension	Strategic reconfiguration	Strategic reconfiguration + co-production	Dependence + diversification	Market formation + productive capacity
Type of EU power exercised	Regulatory + market + investment power	Market + investment + regulatory power	Market + investment + connectivity power	Investment + infrastructural + regulatory influence
Core analytical question	Does CRM partnership generate local value addition?	Can EU engagement support reciprocal industrial upgrading?	Can diversification avoid reproducing commodity dependence?	Can external engagement generate productive capacity without formal CRM diplomacy?

Reading the Cross-Tab

The cross-tab demonstrates that the four countries should not be treated as equivalent cases of CRM diplomacy. **Chile and Kazakhstan represent the strongest cases of formalised EU CRM diplomacy**, whereas Brazil represents an increasingly important but broader strategic-economic relationship and Nigeria operates principally as a contrast case. This variation is analytically useful because it allows the study to distinguish between the externalisation of industrial policy through formal CRM institutions and externalisation through wider instruments of economic governance.

The comparison also reveals that the EU's CRM diplomacy operates along a continuum extending from **resource security to value-chain governance**. Kazakhstan most clearly represents the diversification logic: European policy seeks to reduce concentrated dependencies by developing an alternative resource and connectivity corridor. Chile moves further towards downstream value-chain integration by linking mineral supply with processing, infrastructure, skills, and green technologies. Brazil adds the dimension of scale and industrial co-production, while Nigeria demonstrates that the externalisation of industrial policy can operate through productive ecosystems even where critical raw materials are not the principal organising issue.

The cross-tab therefore supports a central analytical proposition of the chapter: **the form of EU external**

industrial policy is conditioned by the strategic position of the partner within global value chains. Where the partner is primarily important as a source of strategic resources, the EU emphasises diversification and supply security; where the partner possesses significant industrial and market capabilities, the emphasis shifts towards co-investment and value-chain integration; and where the partner's principal strategic importance lies in market formation and productive capacity, the EU relies more heavily on infrastructure, connectivity, energy, digitalisation, and investment.

This variation also highlights an important distinction between **resource diplomacy and industrial diplomacy**. CRM diplomacy begins with the problem of securing critical inputs, but its institutional development increasingly extends into processing, recycling, technology, skills, infrastructure, and sustainable production. The policy therefore moves beyond the acquisition of commodities towards the governance of the conditions under which those commodities are transformed into industrial value.

The comparison further suggests that the success of externalisation cannot be measured solely by whether the EU obtains more secure access to critical materials. A more appropriate measure is whether partnerships produce **diversification, resilience, local value addition, technological upgrading, and more balanced participation in global value chains**. This is particularly important for Chile, Kazakhstan, and Brazil, where the central empirical issue is whether European engagement facilitates downstream industrialisation or reinforces an upstream supplier role.

Nigeria provides an important counterfactual within this framework. Its inclusion demonstrates that the EU's external industrial strategy cannot be reduced to CRM diplomacy alone. Industrial resilience also depends upon markets, energy systems, infrastructure, digital networks, investment conditions, and human capital. Nigeria consequently enables the analysis to capture the broader **ecosystem dimension of externalised industrial policy**.

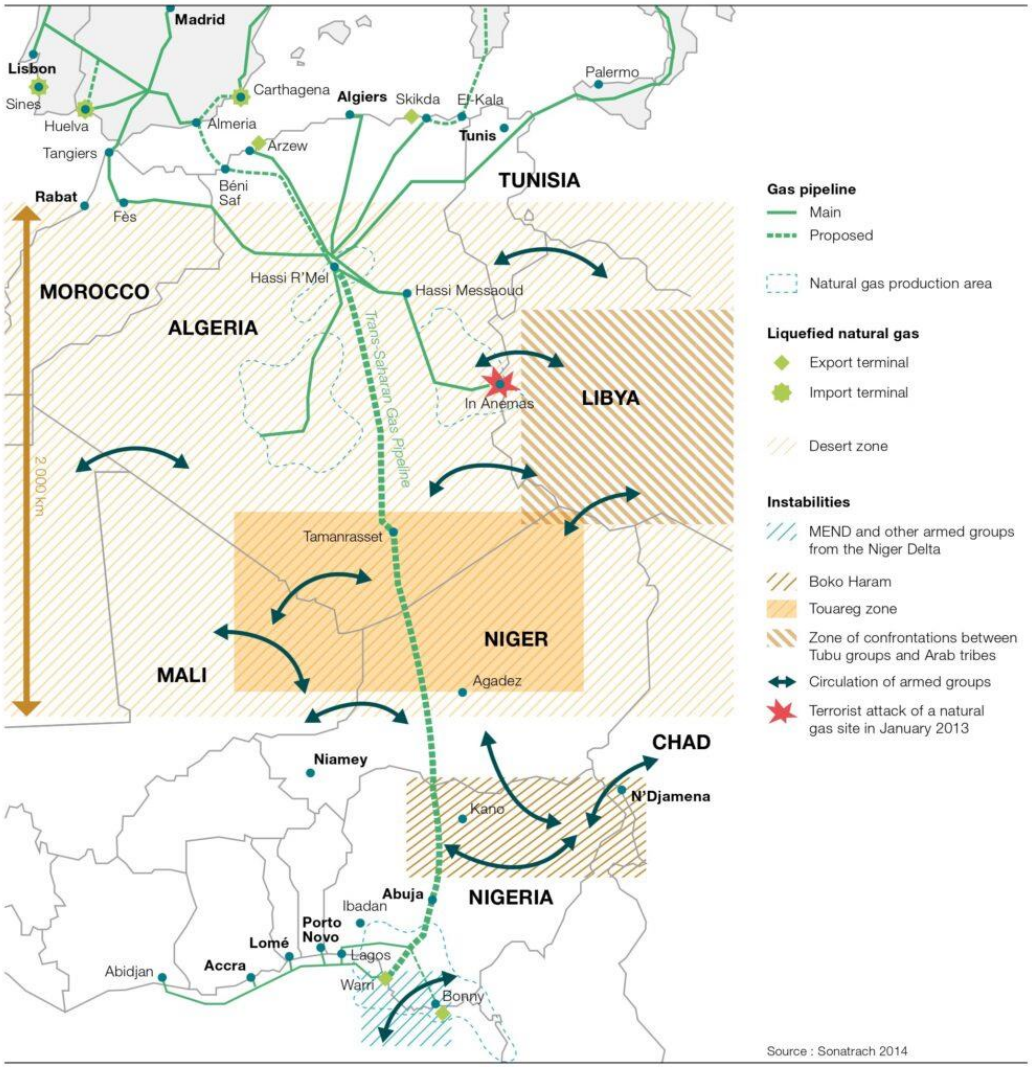
The cross-tab ultimately allows the four cases to be positioned within a single analytical framework while preserving their institutional and economic differences. The cases can therefore be read as four distinct **pivots of European strategic economic governance**: Kazakhstan as the resource and connectivity pivot; Chile as the green-transition and value-chain pivot; Brazil as the scale and industrial-processing pivot; and Nigeria as the market and productive-capacity pivot. Their comparison makes it possible to assess whether the EU's emerging strategy represents merely a diversification of suppliers or a deeper transformation in which Europe increasingly seeks to **shape the international organisation of industrial production itself**.

Algeria, the Sahel and the Security Dimension of the Trans-Saharan Gas Pipeline

The security significance of the Nigeria–Niger–Algeria Trans-Saharan Gas Pipeline extends beyond energy diversification because the project intersects with Algeria's evolving role as a security actor in the Sahel. Algeria has historically favoured political mediation and negotiated settlements over large-scale military intervention, most notably through its role in the 2015 Algiers Agreement concerning Mali. At the same time, its geographical position, extensive borders with Mali, Niger, Libya, and Mauritania, and experience with counterterrorism give Algiers a distinctive strategic position in addressing cross-border movements of jihadist groups, arms, and illicit networks. Algeria has also promoted intelligence-sharing and regional security coordination through mechanisms such as the Joint Operational Staff Committee and the Sahel Fusion and Liaison Unit. This role is evolving as instability across the Sahel intensifies and established Western security arrangements weaken, encouraging Algeria to combine diplomatic engagement with stronger border surveillance, intelligence cooperation, and counterterrorism preparedness.

The Trans-Saharan Gas Pipeline therefore potentially creates an additional layer of **security interdependence between Nigeria, Niger, and Algeria**. For Nigeria, the pipeline provides an additional route for monetising gas reserves and strengthening its position as an energy supplier, while for Niger it could generate transit revenues, infrastructure investment, and incentives to secure the corridor. For Algeria, the project reinforces its position as a Mediterranean energy hub by connecting Nigerian production to its established gas infrastructure and European export routes. For the European Union, the strategic benefit lies in diversifying gas supplies and strengthening energy resilience, while simultaneously deepening relations with three strategically important North and West African states.

FIGURE



Source: https://mapasmilhaud.com/en/curious-maps/the-trans-saharan-gas-pipeline-2014/

The security equation, however, is inherently double-edged. The pipeline's passage through the Sahel exposes critical infrastructure to risks associated with terrorism, insurgency, organised crime, political instability, and sabotage. The same infrastructure that creates economic interdependence can therefore become a target for actors seeking to disrupt state authority or international energy flows. Algeria's evolving counterterrorism role becomes particularly significant in this context because its security capabilities and geographical position allow it to contribute to the protection of the northern section of the corridor while facilitating intelligence and border-security cooperation with neighbouring states. Yet Algeria's influence should not be overstated: deteriorating relations with Mali and the wider reconfiguration of Sahelian politics have demonstrated the limits of its traditional mediation strategy.

The pipeline consequently illustrates a broader transformation in the relationship between **energy security, industrial policy, and regional security**. European energy diversification increasingly depends upon infrastructure located beyond EU territory, meaning that the security of European energy supply is partly dependent upon the political and security conditions of partner countries. In this sense, the TSGP represents externalisation in action: an EU strategic objective—energy diversification—is translated into infrastructure investment and economic cooperation in Africa, while the resulting infrastructure creates incentives for Nigeria, Niger, and Algeria to strengthen security cooperation. The project therefore has the potential to generate a mutually reinforcing relationship in which **energy security supports regional economic integration, while regional security becomes a prerequisite for European energy resilience**.

The analytical significance of Algeria is particularly important. Algiers occupies a position between producer, transit state, security actor, and diplomatic intermediary. Its role cannot therefore be reduced to that of a

conventional gas supplier. As the Sahel becomes increasingly fragmented, Algeria's combination of territorial proximity, intelligence capacity, diplomatic experience, and energy infrastructure gives it a potentially important role in securing the wider corridor. At the same time, the effectiveness of that role will depend on Algeria's ability to maintain workable relations with its Sahelian neighbours and to balance its security interests against those of competing regional and external actors.

The TSGP consequently provides a useful extension of the four-pivot framework. Nigeria represents the **market and productive-capacity pivot**, Niger the **transit and security pivot**, and Algeria the **energy-hub and regional-security pivot**. Together, they demonstrate that externalisation does not stop at the point of establishing a commercial value chain. Once strategic infrastructure crosses borders, the EU's industrial and energy interests become connected to questions of territorial control, counterterrorism, intelligence cooperation, political stability, and regional diplomacy. The security of the supply chain therefore becomes inseparable from the security of the geographical corridor through which that supply chain operates.

The broader conclusion is that the TSGP should be understood not simply as an energy infrastructure project but as a potential **geoeconomic and geostrategic corridor**. Its success would depend upon the simultaneous alignment of commercial viability, infrastructure investment, political cooperation, and security provision. For Nigeria, it offers export diversification and industrial opportunities; for Niger, transit revenues and infrastructure development; for Algeria, greater energy and geopolitical centrality; and for the EU, a potentially more diversified energy relationship with Africa. The project's ultimate value therefore lies in its capacity to transform economic interdependence into a broader framework of **shared energy, infrastructure, and security interests**, while recognising that the same interdependence also creates new vulnerabilities that must be actively managed.

Analytical Conclusion: From External Relations to Externalised Industrial Governance

The four cases provide empirical support for the central argument of this chapter: EU industrial policy is increasingly externalised through the governance of interdependence. The Union's concern with strategic autonomy does not lead inevitably towards economic closure. Instead, it generates new forms of external engagement designed to diversify dependencies, strengthen supply-chain resilience, establish strategic partnerships, and influence the development of industrial capacities beyond the EU.

The cases also help to refine the research gap identified earlier. Existing literature on the Brussels Effect explains how EU rules can shape external markets (Bradford, 2020), while scholarship on weaponised interdependence highlights the strategic significance of economic networks (Farrell & Newman, 2019). However, the four cases demonstrate that the EU's contemporary industrial power increasingly rests upon a third mechanism: the deliberate construction and restructuring of transnational value chains.

This constitutes the analytical contribution of the case studies. The EU does not externalise industrial policy only by exporting regulation. It externalises it by selecting strategic partners, directing investment, establishing standards, developing infrastructure, supporting technology and skills, and integrating partner-country production into European value chains. In doing so, it seeks simultaneously to reduce its own vulnerabilities and influence the productive transformation of external economies.

The four pivots therefore reveal a shift from an earlier model of external economic governance based primarily on market opening towards a model centred on strategic economic interdependence. Kazakhstan, Brazil, Nigeria, and Chile represent different manifestations of this transition. Their differences are analytically valuable because they demonstrate that EU externalisation is not a single policy instrument but a flexible strategy adapted to the structure of each partner economy.

The central conclusion is consequently that the EU's emerging industrial policy should be understood as geoeconomic rather than merely economic. Its objective is no longer limited to increasing European productivity or correcting domestic market failures. It increasingly seeks to shape the international distribution of resources, technologies, infrastructure, investment, and productive capacity upon which European competitiveness depends. The externalisation of industrial policy thus becomes a mechanism through which the EU converts market power, regulatory capacity, investment capabilities, and partnership networks into strategic influence.

In this respect, the four pivots are not peripheral to European industrial policy. They are increasingly part of its external architecture. Kazakhstan, Brazil, Nigeria, and Chile demonstrate how European industrial strategy extends across borders and becomes embedded in the governance of global value chains. The analytical significance of these cases therefore lies not simply in what they reveal about EU relations with four individual

countries, but in what they reveal about a broader transformation: the emergence of the EU as an actor seeking to govern the external conditions of its own industrial resilience.

The four cases also caution against treating the externalisation of EU industrial policy as a coherent or fully centralised strategy, since the Union's external instruments emerge from the interaction of Commission initiatives, member-state preferences, commercial interests, and partner-country priorities. What appears as a unified European strategy may therefore constitute a negotiated assemblage of partially overlapping policies rather than a single, deliberately coordinated blueprint. This institutional fragmentation is analytically important because it affects both the speed and credibility with which the EU can translate industrial objectives into external partnerships.

The cases further suggest that the EU's bargaining power varies substantially across sectors and partner countries, meaning that regulatory power should not be assumed to translate automatically into political influence. In resource-rich economies, for example, partner governments may possess considerable leverage because the EU competes with other external actors for access to minerals, energy, investment opportunities, and infrastructure projects. Kazakhstan's position within competing Eurasian transport and resource networks illustrates particularly clearly that European diversification does not necessarily imply European dominance. The EU must instead construct partnerships within an increasingly competitive geoeconomic environment in which China, Russia, the United States, Gulf states, and other actors offer alternative sources of capital, technology, infrastructure, and market access. This competitive environment limits the extent to which the EU can impose its preferred regulatory or sustainability standards without negotiation.

The same observation applies to Chile, where the strategic importance of lithium and copper gives the Chilean state and domestic producers an opportunity to negotiate the terms under which foreign capital and technology enter national value chains. Consequently, externalisation should be conceptualised as a process of co-production, in which European industrial objectives interact with the developmental and political strategies of partner countries. This perspective also complicates the assumption that EU external industrial policy is necessarily mutually beneficial. Although the EU frames many of its partnerships in terms of sustainable development, resilience, and shared prosperity, the distribution of gains across the value chain remains an empirical question rather than an established outcome.

The crucial issue is therefore whether European partnerships generate domestic processing, technological upgrading, skills development, and higher-value production in partner countries or primarily secure reliable access to upstream inputs for European industry. This distinction is particularly significant in the cases of Kazakhstan and Chile, where the risk of reproducing commodity-dependent development remains present even within contemporary green-industrial partnerships. The green transition may consequently create a paradox in which European efforts to reduce dependence on fossil fuels generate new forms of dependence on geographically concentrated critical minerals. The externalisation of industrial policy should therefore be understood not as the elimination of dependency but as an attempt to recompose dependency across different suppliers, technologies, and geographical networks.

This distinction is central to the concept of open strategic autonomy because resilience depends not on autarky but on the capacity to maintain diversified and politically manageable forms of interdependence. Brazil introduces an additional complication because its industrial and technological capabilities mean that it cannot easily be positioned as a passive recipient of European industrial strategy. The country's scale allows Brazilian policymakers and firms to pursue their own strategies of industrial upgrading, environmental governance, and technological development, creating opportunities for bargaining and policy divergence.

Nigeria similarly demonstrates that the success of external industrial policy depends upon domestic institutional capacity, infrastructure, energy reliability, human capital, and the ability of local firms to capture value from international investment. European investment alone cannot guarantee industrial transformation if the domestic conditions necessary for technological absorption and productive upgrading remain weak. The cases therefore suggest that externalisation operates through an interaction between European policy capacity and partner-country absorptive capacity. Where this interaction is strong, external partnerships may generate forms of industrial co-development that benefit both sides. Where it is weak, externalisation may instead reproduce asymmetric production structures in which European firms retain control over technology, finance, standards, and high-value segments of the value chain.

This possibility introduces an important political-economy dimension that is sometimes underdeveloped in accounts of the Brussels Effect. Regulatory influence may shape the rules governing markets, but it does not

necessarily determine who captures the economic value created within those markets. The distinction between regulatory power and productive power is therefore essential to understanding contemporary EU industrial strategy. The four pivots indicate that the EU is increasingly attempting to exercise both forms of power simultaneously: shaping the rules under which global production occurs while also influencing where investment, infrastructure, processing, and technological capabilities are located.

The analytical implication is that future research should examine not only whether EU policies are adopted by external partners, but also how those policies redistribute productive capabilities and value across international supply chains. The central research question consequently shifts from whether the EU can externalise its industrial policy to a more consequential question: under what conditions does the externalisation of EU industrial policy produce resilient, mutually beneficial value-chain integration rather than a reconfiguration of dependency?

Analytical Summary: Externalisation in Action

The four cases demonstrate that the externalisation of EU industrial policy is not an abstract extension of domestic policy beyond the Union's borders, but a concrete process through which European industrial priorities are translated into external partnerships, investment strategies, regulatory arrangements, and value-chain interventions. The cases of Kazakhstan, Brazil, Nigeria, and Chile reveal how the EU increasingly seeks to govern the external conditions of European competitiveness by shaping access to resources, infrastructure, technology, markets, and productive capacity. In this sense, externalisation is best understood as a process through which internal industrial objectives are projected outward, negotiated with external partners, and subsequently embedded within transnational production networks.

The analytical framework developed in this chapter identifies three interconnected mechanisms through which this process operates: projection, dependence, and strategic reconfiguration. The empirical cases demonstrate that these mechanisms should not be treated as discrete stages. Rather, they interact dynamically. The EU projects regulatory preferences, investment priorities, sustainability requirements, and industrial standards into partner economies; it simultaneously responds to vulnerabilities created by external dependencies; and it seeks to reconfigure those dependencies through diversification, value-chain integration, infrastructure development, and strategic investment. Externalisation therefore operates as a feedback mechanism between the internal and external dimensions of European industrial policy.

The first mechanism, projection, is visible in the way European standards, sustainability criteria, investment priorities, and market-access requirements become incorporated into external partnerships. CRM diplomacy illustrates this particularly clearly. Through strategic partnerships, the EU does not simply seek access to lithium, copper, rare earths, or other strategic inputs. It promotes particular approaches to extraction, processing, environmental governance, technological cooperation, skills, and value-chain development. The external partner consequently becomes incorporated into a policy architecture partially shaped by European industrial and regulatory priorities. The Brussels Effect is relevant here, but the cases suggest that regulatory projection increasingly operates alongside financial and investment instruments rather than through regulation alone (Bradford, 2020).

The second mechanism, dependence, provides the strategic rationale for this external engagement. The EU's growing concern with critical raw materials, supply-chain concentration, technological dependencies, and geopolitical vulnerabilities demonstrates that industrial competitiveness is inseparable from the structure of international interdependence. Kazakhstan illustrates this most directly, as European engagement seeks to diversify access to strategic resources and transport routes. Chile similarly addresses European exposure to concentrated supplies of lithium and copper. Brazil represents a broader attempt to diversify CRM and industrial value chains, while Nigeria demonstrates that dependency extends beyond minerals to energy, infrastructure, digital connectivity, and market access. The cases therefore confirm that European industrial policy is increasingly concerned not with eliminating interdependence but with governing its vulnerabilities.

The third mechanism, strategic reconfiguration, is where externalisation becomes most clearly visible as industrial policy. The EU seeks to modify the geographical and organisational structure of production rather than simply secure existing supplies. This involves encouraging processing and downstream activities, supporting infrastructure, facilitating investment, developing skills, promoting renewable energy, and connecting partner-country production to European value chains. The Chilean case is particularly illustrative because cooperation around lithium and copper is increasingly framed in terms of sustainable value-chain development rather than extraction alone. Kazakhstan similarly illustrates the attempt to connect raw materials with batteries and renewable hydrogen. Brazil extends this logic through its combination of critical raw materials, industrial

investment, clean energy, and infrastructure, while Nigeria demonstrates how strategic reconfiguration can occur through the development of wider productive ecosystems.

The empirical evidence therefore reinforces the argument that externalisation is a form of value-chain governance. The EU increasingly seeks to influence not merely what is traded, but where extraction occurs, where processing takes place, how infrastructure is developed, which technologies are deployed, and which standards govern production. This represents a significant analytical shift. Conventional accounts of EU external economic power have often emphasised trade agreements, market access, or regulatory diffusion. The four cases suggest that contemporary EU industrial power increasingly operates through the capacity to shape the configuration of global production networks themselves.

At the same time, the cases complicate any interpretation of externalisation as a unilateral projection of European power. The partner countries possess their own resources, markets, political priorities, and development strategies. Brazil's economic scale, Kazakhstan's geopolitical position, Chile's strategic mineral endowment, and Nigeria's demographic and market significance all provide partner governments with bargaining resources. Externalisation is therefore better conceptualised as negotiated interdependence than as simple European policy diffusion. The EU may seek to influence external production, but the outcomes depend upon the interaction between European capabilities and partner-country agency.

This observation introduces an important qualification to the concept of EU regulatory power. Regulatory influence does not necessarily translate into control over the distribution of economic value. A partner country may adopt European sustainability standards while continuing to occupy a relatively low-value position within a global production chain. Conversely, investment and technology cooperation may contribute to genuine industrial upgrading if domestic firms and institutions acquire greater productive and technological capabilities. The relevant analytical distinction is therefore between regulatory influence and productive transformation.

This distinction is particularly important for evaluating CRM diplomacy. If the EU's partnerships simply secure reliable supplies of unprocessed minerals, externalisation may reduce European vulnerability while simultaneously reproducing dependency in partner countries. If, however, the partnerships generate local processing, technology transfer, skills, infrastructure, and downstream industrial capacity, they may produce a more reciprocal form of value-chain integration. The effectiveness of externalisation must therefore be assessed through outcomes on both sides of the relationship rather than through European supply security alone.

The four cases also reveal different degrees of externalisation. Kazakhstan represents externalisation through resource diversification and connectivity; Chile through green-transition value-chain integration; Brazil through industrial scale, investment, and co-production; and Nigeria through market formation and productive-capacity development. Their differences demonstrate that externalised industrial policy is not a single instrument but a differentiated strategy adapted to the structural characteristics of partner economies.

This variation strengthens rather than weakens the analytical framework. It suggests that the mechanisms of externalisation are contingent upon the position occupied by the partner within global value chains. Where strategic resources constitute the primary source of partner-country leverage, as in Kazakhstan and Chile, the EU prioritises diversification and value-chain security. Where industrial capacity and market scale are more prominent, as in Brazil, the emphasis shifts towards investment and co-production. Where the principal opportunity lies in market development, infrastructure, energy, and productive capacity, as in Nigeria, externalisation operates through a broader ecosystem of economic governance.

The cases consequently provide empirical support for the chapter's central proposition that EU industrial policy is increasingly externalised when the determinants of European industrial competitiveness lie beyond the EU's territorial jurisdiction. The more European competitiveness depends upon external resources, technologies, infrastructure, markets, and production networks, the more industrial policy necessarily acquires an external dimension. Externalisation is therefore not simply a policy choice; it is also a structural consequence of the organisation of contemporary global production.

The analytical significance of this finding extends beyond CRM diplomacy. Critical raw materials provide a particularly visible entry point because they connect climate policy, industrial competitiveness, trade, investment, and economic security. Yet the four cases demonstrate that the same logic extends into digital infrastructure, renewable energy, logistics, skills, market development, and technological cooperation. CRM diplomacy should therefore be understood as one component of a broader transformation towards strategic economic governance.

The analysis also clarifies the relationship between open

strategic autonomy and externalisation. Strategic autonomy does not require the EU to withdraw from international markets. Instead, it involves creating sufficient domestic and external capabilities to ensure that interdependence remains politically and economically manageable. External partnerships are consequently not contradictory to strategic autonomy; they are one of its principal instruments. The EU seeks autonomy *through diversification and partnership*, rather than autonomy *from* international economic integration.

The central analytical conclusion is therefore that externalisation in action represents the coupling of internal industrial objectives with external value-chain intervention. Projection provides the mechanism through which European preferences travel outward; dependence provides the strategic rationale for intervention; and strategic reconfiguration provides the means through which the EU attempts to reshape international production. The four pivots demonstrate how these mechanisms operate in practice and how their effects vary according to partner-country capabilities and interests.

This coupling also addresses the research gap identified earlier. Existing scholarship on EU regulatory power explains how European rules can acquire effects beyond the Union, while research on industrial policy explains the renewed importance of state intervention in competitiveness, resilience, and strategic sectors. What has been less systematically examined is the interaction between these two processes: how the EU's internal industrial transformation generates external forms of power and how external partnerships, in turn, reshape European industrial strategy. The four cases provide a basis for addressing this gap by demonstrating that industrial policy is increasingly produced across borders.

The resulting conceptualisation moves the analysis beyond the conventional distinction between internal industrial policy and external economic policy. The EU's contemporary industrial strategy increasingly occupies the space between the two. It is simultaneously concerned with European production capacity and external supply chains, domestic regulation and international standards, European investment and partner-country industrial development, and internal resilience and global interdependence. Externalisation is therefore not the international afterlife of industrial policy; it is increasingly constitutive of industrial policy itself.

Ultimately, the four cases suggest that the key question for the future of EU industrial policy is not whether Europe will externalise its industrial strategy, but what kind of externalisation it will pursue and with what consequences. An externalisation centred narrowly on resource acquisition could reproduce asymmetric dependencies and intensify competition over strategic commodities. An externalisation centred on reciprocal investment, technological upgrading, sustainable value chains, and partner-country productive capacity could instead generate a more resilient and mutually beneficial model of interdependence. The distinction between these outcomes provides the central empirical and analytical problem for the subsequent comparative analysis.

The four pivots thus demonstrate externalisation in action: Kazakhstan connects resource security to connectivity; Chile connects critical minerals to the green industrial transition; Brazil connects CRM diplomacy to scale, investment, and industrial co-production; and Nigeria connects European strategic interests to markets, infrastructure, energy, and productive capacity. Together, they show an EU attempting to transform its position within global value chains rather than merely respond to them. The externalisation of industrial policy can consequently be understood as the EU's emerging strategy for governing the external conditions of European industrial resilience while simultaneously negotiating the distribution of value and capability across an increasingly contested global economy.

11. Central Asia as an Emerging Industrial Space

Central Asia is frequently represented in the international political economy as a resource-rich but structurally peripheral region: a space of hydrocarbons, uranium, minerals and transit routes situated between larger centres of power. This representation is not entirely wrong, but it is increasingly inadequate. It captures the geography of Central Asia while underestimating its changing economic function.

The region is better understood as an emerging industrial space in which resource endowments, energy systems, infrastructure, manufacturing capabilities, human capital, regional markets and geopolitical positioning are increasingly interacting. Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan and Turkmenistan differ substantially in economic structure, institutional capacity and political orientation, but together they form an increasingly important economic geography between Europe, China, Russia, South Asia and the Middle East.

This transformation does not mean that Central Asia has ceased to be commodity-dependent. Kazakhstan remains heavily associated with oil, gas, uranium and metals; Turkmenistan remains overwhelmingly dependent on

natural gas; Uzbekistan continues to rely substantially on commodities while expanding manufacturing; and Kyrgyzstan and Tajikistan remain highly exposed to gold, hydropower, agriculture and remittances. The point is rather that these resource endowments are increasingly becoming inputs into wider industrial strategies.

The distinction is important. A resource periphery exports commodities. An industrial space uses resources, energy, infrastructure and knowledge to construct increasingly complex value chains.

The emergence of Central Asia as an industrial space is therefore not simply a story of extraction. It is a story of value-chain formation.

The region is increasingly positioned at the intersection of several transformations: the diversification of European supply chains, China's westward economic expansion, Russia's changing regional role, the development of the Trans-Caspian or Middle Corridor, the global energy transition, demand for critical minerals, the expansion of renewable energy and the search for new manufacturing locations. The first EU–Central Asia Summit in April 2025, which elevated EU–Central Asia relations to a strategic partnership and announced a €12 billion Global Gateway investment package, illustrates how rapidly this geographical space has acquired strategic economic significance. The package focuses on transport, critical raw materials, digital connectivity, water and energy, while a further €10 billion international investment package has been mobilised around sustainable transport infrastructure and logistics.

The central proposition of this chapter is therefore that Central Asia should no longer be analysed primarily as a resource periphery, but as a potentially significant production, energy, logistics and strategic-connectivity platform. The transition is neither automatic nor complete. It depends upon infrastructure, institutions, investment, regional cooperation, technological upgrading and the ability of governments to transform natural-resource rents into productive capabilities.

10.1 Why Central Asia matters

Central Asia matters because several previously separate economic trends are converging in the region.

Its first advantage is geographical. Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan and Turkmenistan occupy the landmass between China, Russia, the Caspian Sea, Iran, Afghanistan and the wider South Asian and European markets. For centuries, this geography made Central Asia a zone of movement and exchange. Contemporary infrastructure is recreating this function in modern form through railways, roads, logistics centres, pipelines, electricity networks, fibre-optic infrastructure and ports.

Its second advantage is resource endowment. The region possesses hydrocarbons, uranium, copper, zinc, chromium, manganese, rare and critical minerals, gold and other strategic materials. Kazakhstan is particularly significant in uranium, oil and metals, while Uzbekistan combines gold, copper, natural gas and an increasingly diversified industrial base. Kyrgyzstan and Tajikistan possess significant hydropower and mineral resources, while Turkmenistan has exceptionally large natural-gas reserves.

Its third advantage is demographic and market potential. Central Asia contains a population of more than 80 million people, with Uzbekistan representing the largest national market and one of the region's most important sources of labour and consumer demand. The region's relatively young populations create both a challenge and an opportunity: without sufficient productive employment, demographic growth can generate pressure on labour markets and public services; with industrialisation, it can provide the workforce necessary for manufacturing, services and technological upgrading.

Its fourth advantage is political diversification. Central Asian governments have increasingly pursued what can be described as multi-vector economic diplomacy. Rather than placing the region exclusively within a Russian or Chinese sphere, governments have sought relationships with multiple external partners, including the EU, Türkiye, Gulf states, South Korea, Japan and international financial institutions.

Its fifth advantage is strategic timing. The fragmentation of globalisation, the war in Ukraine, US–China competition and the green transition have increased the value of alternative supply chains and transport corridors. The EBRD estimated that Central Asian economies grew by 6.9% in 2025 and expected growth to moderate to 5.6% in 2026, although it also identifies commodity-price volatility, remittance dependence and continued dependence on Russian and Chinese markets as important risks.

Central Asia therefore occupies an unusual position. It is simultaneously a resource supplier, emerging production base, transport corridor, energy platform and geopolitical balancing space.

This combination is what makes the region increasingly relevant to European industrial policy.

10.2 Kazakhstan

Kazakhstan is the most important industrial and resource economy in Central Asia and is likely to remain the region's principal bridge between resource extraction and higher-value industrialisation.

Its traditional economic model has been built around oil, gas, uranium and metals. This resource base has generated substantial export revenues and foreign investment, but it has also created the structural risks associated with commodity dependence. The question for Kazakhstan is therefore not whether resources remain important—they clearly will—but whether resource wealth can increasingly be converted into domestic processing, manufacturing, infrastructure and technological capabilities.

There are already indications of such a transition.

Kazakhstan possesses extensive capabilities in metallurgy, mining equipment, petrochemicals, chemicals, machinery, food processing and transport services. Its geographical scale also creates opportunities for industrial clusters around mining regions, logistics hubs and energy-intensive production.

The country's position on the Caspian Sea gives it particular significance for the Trans-Caspian route. The Port of Aktau, together with the Caspian port of Kuryk and associated rail and logistics infrastructure, provides a potential connection between Central Asian production and Azerbaijan, Georgia, Türkiye and European markets. The EBRD and EU have supported expansion of cargo-handling capacity at Aktau, identifying the port as an important component of the Trans-Caspian Corridor.

Kazakhstan is also becoming increasingly important to European critical-mineral strategy. The EU and Kazakhstan have developed cooperation on raw materials, batteries and renewable hydrogen, while European initiatives increasingly seek to connect resource extraction with sustainable processing and industrial value chains.

This is a significant departure from the simple resource-periphery model. The strategic question is no longer merely whether Kazakhstan exports copper, uranium or oil. It is whether Kazakhstan can capture more of the processing, engineering, logistics, technology and manufacturing value associated with those resources.

Energy presents another major opportunity. Kazakhstan remains heavily dependent on fossil fuels, and coal continues to play an important role in electricity generation. Yet renewable capacity is expanding, with the EBRD reporting that Kazakhstan commissioned 503 MW of new renewable capacity in 2025 and that renewables accounted for approximately 7% of electricity generation.

Kazakhstan's challenge is therefore one of industrial upgrading under conditions of resource abundance. Its success will depend on whether resource revenues are converted into infrastructure, skills, technology, domestic supplier networks and diversified productive capacity.

10.3 Uzbekistan

Uzbekistan is arguably the most important case for understanding Central Asia's movement from resource economy towards industrial space.

Unlike Kazakhstan, Uzbekistan's strategic significance rests less on its role as a major energy exporter and more on its combination of population, market size, labour supply, geographic centrality and industrial potential.

The country's economic reforms since 2017 have progressively opened the economy to foreign investment, liberalised exchange-rate arrangements and encouraged private-sector development. The result has been greater integration with international capital and production networks.

Uzbekistan possesses important resources, including natural gas, gold, copper and uranium, but its industrial potential extends substantially beyond extraction. Textile production, automotive manufacturing, chemicals, construction materials, food processing, machinery and electrical equipment provide foundations for further industrial diversification.

Its demographic weight is crucial. Uzbekistan's population makes it the natural centre of a regional market that can support manufacturing at a scale unavailable to several of its smaller neighbours. Industrialisation in Uzbekistan therefore has the potential to generate regional spillovers through supplier networks and cross-border trade.

The country's location also makes it indispensable to regional connectivity. Rail and road links connecting Uzbekistan to Kazakhstan, Kyrgyzstan, Tajikistan, Afghanistan and, indirectly, the Caspian and European markets give it a potential role as a Central Asian manufacturing and distribution hub.

European engagement is increasingly reflecting this potential. EU cooperation with Uzbekistan under Global Gateway includes digital connectivity, clean energy, critical raw materials and the development of the Trans-

Caspian Transport Corridor.

Energy transition is particularly important. Uzbekistan is rapidly expanding solar and wind generation and developing battery storage. In 2025, the EBRD supported a 1 GW solar project combined with 1,336 MWh of battery storage, while the country's renewable-energy strategy targets substantial additional solar and wind capacity by 2030.

Uzbekistan therefore represents a potentially different development trajectory from Kazakhstan: not simply a resource exporter seeking diversification, but a large labour-intensive and increasingly energy-intensive industrial economy seeking integration into global value chains.

Its central challenge is whether industrial expansion can generate productivity growth rather than merely low-cost assembly. That will require skills, technology transfer, domestic suppliers, logistics, reliable electricity and access to European and Asian markets.

10.4 Kyrgyzstan

Kyrgyzstan occupies a different position within the regional industrial system.

Its economy is smaller, mountainous and more dependent on agriculture, gold mining, services and remittances. It lacks the hydrocarbon and industrial scale of Kazakhstan and Uzbekistan. Nevertheless, this does not make Kyrgyzstan peripheral to regional industrialisation.

Its most important potential lies in hydropower, water resources, logistics, agriculture, tourism, light manufacturing and regional trade.

Hydropower is particularly important because Kyrgyzstan possesses substantial untapped potential. Electricity generation can support domestic industrialisation while also creating opportunities for regional electricity trade.

The country's geographical position also matters. Kyrgyzstan borders Kazakhstan, Uzbekistan, Tajikistan and China, placing it directly within emerging regional transport and trade networks.

The development of stronger economic relations among the Central Asian states is particularly important for Kyrgyzstan because its domestic market is too small to support large-scale industrial diversification on its own. Regional integration can therefore transform geographic constraints into advantages.

Recent political developments are relevant here. Kyrgyzstan and Tajikistan reached a landmark border agreement, while Kyrgyzstan, Tajikistan and Uzbekistan have simultaneously strengthened trilateral cooperation. The EBRD has identified these developments as potentially supportive of regional collaboration and connectivity.

Kyrgyzstan should consequently be understood not primarily as a failed industrial state surrounded by larger economies, but as a potential energy, logistics and specialised-production node within a regional industrial system.

Its principal constraints remain institutional capacity, infrastructure quality, energy investment, access to finance and exposure to external economic shocks.

10.5 Turkmenistan

Turkmenistan is the most difficult case for the emerging industrial-space argument because its economy remains exceptionally dependent on natural gas and is characterised by limited economic openness.

The country possesses some of the world's major natural-gas resources and has sought to diversify export routes. Its geographical position gives it potential connections towards China, Iran, Afghanistan, the Caspian Sea and Türkiye. However, infrastructure, financing, political constraints and limited regional integration restrict the extent to which these possibilities have been realised.

The EBRD notes that Turkmenistan has made modest progress in diversifying gas-export routes, including swap-based deliveries to Türkiye, but remains constrained by its landlocked geography, politically sensitive transit corridors and the slow development of regional projects such as TAPI.

Turkmenistan's renewable-energy development is also at an early stage. A first 10 MW renewable-energy project has been launched, alongside methane-monitoring initiatives, but subsidised gas-based electricity reduces incentives for rapid renewable deployment.

Nevertheless, Turkmenistan should not be excluded from the emerging industrial geography. Its gas resources could become an industrial input rather than merely an export commodity, particularly through petrochemicals, fertilisers, chemicals and potentially low-carbon industrial production.

The strategic issue is whether Turkmenistan can move from gas extraction to gas-based industrialisation, while simultaneously reducing the economic and environmental risks associated with excessive fossil-fuel dependence.

10.6 Tajikistan

Tajikistan's industrial potential is closely connected to hydropower, minerals, aluminium, agriculture and regional infrastructure.

The country possesses exceptional hydropower potential due to its mountainous geography. This provides a potentially valuable foundation for energy-intensive industries and regional electricity exports. Tajikistan also possesses mineral resources, including antimony and other metals, while aluminium has historically represented an important industrial sector.

Its principal weakness is connectivity. Tajikistan is landlocked, mountainous and relatively distant from major international markets. Consequently, infrastructure is not simply a supporting condition for industrialisation; it is a prerequisite.

The country's relationship with Uzbekistan and Kyrgyzstan is therefore economically significant. Improved regional relations can create new electricity, water, transport and trade opportunities that were previously constrained by political tensions.

The modernisation of Tajikistan's hydropower infrastructure demonstrates how energy can become an industrial platform. The EBRD reports that the Qairokkum hydropower plant's capacity increased from 126 MW to 174 MW, improving electricity reliability for approximately 500,000 people in Sughd province.

Tajikistan's challenge is therefore to transform energy and mineral endowments into productive capabilities and export diversification, rather than allowing infrastructure and commodity dependence to reproduce peripheral status.

10.7 Critical minerals

Critical minerals may be the most important mechanism through which Central Asia's resource base becomes integrated into the new global industrial economy.

The green and digital transitions require enormous quantities of minerals and processed materials. Copper is necessary for electrification and grids; lithium and graphite are associated with batteries; uranium remains important for nuclear power; rare earth elements support advanced technologies; and a wide range of metals are essential to electronics, defence and renewable-energy technologies.

Central Asia possesses many of these resources. Kazakhstan is particularly important because of its uranium, chromium, copper, zinc and other mineral resources. Uzbekistan possesses significant gold, copper and uranium resources. Kyrgyzstan and Tajikistan possess additional deposits, although the scale and commercial viability vary substantially.

The strategic opportunity is not simply to increase extraction. The greater opportunity is to establish regional mineral value chains.

These could include geological exploration, extraction, refining, processing, recycling, component manufacturing, engineering services and specialised logistics. Such value chains would create substantially more domestic value than the export of unprocessed ores.

This is precisely where European industrial policy becomes relevant.

The EU's emerging relationship with Central Asia explicitly links critical raw materials with industrial and green-transition objectives. The 2025 EU–Central Asia summit endorsed cooperation on sustainable critical-raw-material value chains, while the EU has established programmes intended to identify projects and strengthen raw-material and battery supply chains.

The EBRD's direct investment in the Sarytogan graphite project in Kazakhstan illustrates the emergence of this new relationship between European finance and Central Asian mineral development.

The strategic question is therefore whether Central Asia will become merely a mine for the European green transition, or whether European and Central Asian industrial policy can create shared value chains in which processing, technology and manufacturing are also developed locally.

The latter would represent a genuine break with the resource-periphery model.

10.8 Energy

Energy sits at the centre of Central Asia's industrial transformation.

The region possesses substantial fossil-fuel resources, especially oil and gas in Kazakhstan and gas in Turkmenistan and Uzbekistan. These resources remain economically important and will continue to support industrial activity for years.

But Central Asia also possesses enormous renewable-energy potential, particularly solar, wind and hydropower.

This creates a dual transition.

The first is from fossil fuels towards renewable energy.

The second is from energy exports towards energy-intensive industrialisation based on abundant low-carbon electricity.

The second transition may ultimately be more economically significant.

If Central Asia can generate large quantities of reliable and relatively inexpensive renewable electricity, this could attract industries requiring substantial energy inputs: metals processing, chemicals, fertilisers, data centres, green hydrogen, battery materials and advanced manufacturing.

The EBRD's recent investments demonstrate the direction of travel. Across Central Asia and Mongolia, almost US$2 billion was invested in 2025, with more than half directed towards green-economy projects; renewable-energy projects included major solar, battery and hydropower investments.

Energy therefore becomes more than a sector. It becomes an industrial platform.

The challenge is that renewable generation must be accompanied by grid modernisation, storage, transmission and regional electricity trading. Without these complementary investments, renewable capacity may remain disconnected from industrial demand.

10.9 Green hydrogen

Green hydrogen is frequently presented as one of Central Asia's most promising future industries, but the concept requires careful qualification.

Green hydrogen is attractive because Central Asia has extensive solar, wind and hydropower potential, large areas of available land and industrial sectors that could potentially consume hydrogen or hydrogen-derived products.

Yet hydrogen is not valuable simply because it can be produced. The economic case depends on production costs, water availability, electricity prices, transport infrastructure and the existence of reliable long-term demand.

This makes hydrogen derivatives potentially more important than hydrogen exports themselves.

Ammonia, methanol, fertilisers, green steel and other hydrogen-intensive products can embed renewable energy into tradable industrial commodities. This could allow Central Asian economies to export industrial value rather than simply electricity or hydrogen molecules.

Uzbekistan is already moving in this direction. The EBRD has supported what it describes as Central Asia's first renewable-hydrogen facility, aimed at decarbonising fertiliser production.

Kazakhstan is also positioning itself in renewable hydrogen through cooperation with the EU on raw materials, batteries and renewable hydrogen.

The central constraint, however, is water. Central Asia is one of the world's most water-stressed regions, and large-scale hydrogen production cannot be considered independently of water availability and agricultural needs.

Green hydrogen should therefore be understood not as an isolated energy project but as part of an integrated water–energy–industrial system.

10.10 Renewable energy

Renewable energy could fundamentally alter the geography of industrialisation in Central Asia.

Historically, industrial activity was concentrated around fossil-fuel deposits, Soviet-era infrastructure and established urban centres. Renewable energy introduces a different spatial logic. Solar and wind resources can support industrial development in areas previously distant from major energy production.

Kazakhstan has substantial wind and solar potential, while Uzbekistan combines high solar potential with rapidly growing electricity demand. Kyrgyzstan and Tajikistan possess exceptional hydropower potential.

The region's renewable transition therefore has the potential to support both decarbonisation and industrialisation.

This is particularly important for Europe. European firms increasingly face pressure to decarbonise production, while European industrial policy seeks secure supplies of clean technologies and critical materials. Central Asia can potentially contribute to both objectives by combining minerals, renewable electricity and manufacturing.

However, renewable energy should not be measured only in megawatts installed. The more meaningful industrial indicators are whether renewable investment improves

electricity reliability, lowers industrial energy costs, supports new manufacturing capacity and enables export-oriented production.

The EBRD's experience in Kazakhstan demonstrates the importance of combining financing with regulatory reform. Its renewable-energy programme helped support competitively tendered capacity while simultaneously reducing investor risk and improving auction and power-purchase arrangements.

The lesson is broader: renewable energy becomes an industrial policy only when it changes the cost and reliability conditions facing firms.

10.11 Manufacturing

Manufacturing is the decisive test of whether Central Asia can escape the resource-periphery model.

Resources, energy and infrastructure create opportunities, but manufacturing is what converts those assets into diversified productive capabilities.

The region already possesses significant manufacturing activity. Kazakhstan has metallurgy, machinery, petrochemicals and food processing. Uzbekistan has automotive, textiles, chemicals, machinery and construction materials. Kyrgyzstan has light manufacturing and agro-processing. Tajikistan has aluminium and food-processing capabilities. Turkmenistan has petrochemicals and fertiliser production.

The challenge is to move from relatively low-value production towards higher-value manufacturing and regional supplier networks.

This requires several complementary conditions.

First, firms need reliable energy and infrastructure.

Second, they require access to finance.

Third, they require skilled labour.

Fourth, they need technology and management capabilities.

Fifth, they require access to sufficiently large markets.

Sixth, foreign investment needs to generate technology transfer and local supplier development rather than functioning solely as an enclave activity.

This is why industrialisation cannot be separated from regional integration. A factory in Uzbekistan, Kazakhstan or Kyrgyzstan becomes more attractive when it can serve a regional market rather than only the domestic population.

The EBRD's recent regional investment pattern is indicative of this emerging model. In 2025, around 15% of its Central Asian investment supported manufacturing and services, while substantial financing went through local banks to SMEs and entrepreneurs.

This suggests a gradual movement from infrastructure and sovereign lending towards a broader private-sector industrial ecosystem.

10.12 Regional markets

The emergence of Central Asia as an industrial space depends heavily on the development of a genuine regional market.

Historically, the five economies were divided by political boundaries, infrastructure inherited from the Soviet system and disputes over water, borders and transport. These divisions limited the development of integrated regional value chains.

The situation is changing.

Improved relations between Uzbekistan, Kazakhstan, Kyrgyzstan and Tajikistan create opportunities for greater trade and investment integration. Border agreements, transport links, electricity trade and regional cooperation can reduce the economic costs associated with fragmentation.

The economic logic is powerful. A Central Asian firm serving a market of more than 80 million people has substantially greater scale than a firm operating exclusively within a smaller national market.

Regional integration can therefore generate economies of scale in manufacturing, logistics, food processing, energy and services.

It can also enable specialisation across countries.

Kazakhstan can provide minerals, capital and logistics.

Uzbekistan can provide labour, manufacturing capacity and market scale.

Kyrgyzstan and Tajikistan can provide hydropower, agricultural production and specialised resources.

Turkmenistan can provide gas and petrochemical inputs.

The objective is not to create identical industries in every country. It is to develop complementary production systems.

This is the essence of an industrial space.

10.13 Infrastructure

Infrastructure is the physical foundation of Central Asia's industrial transformation.

Roads and railways are important, but modern industrial infrastructure extends far beyond transport. It includes ports, warehouses, electricity grids, pipelines, digital networks, customs systems, industrial parks, water infrastructure and logistics platforms.

The Trans-Caspian or Middle Corridor has become particularly important because it provides an alternative connection between China and Europe through Kazakhstan, the Caspian Sea, Azerbaijan and Georgia.

The World Bank estimates that a combination of infrastructure investment and efficiency improvements could halve travel times and triple freight volumes along the Middle Corridor by 2030. It also stresses that the corridor should not be understood simply as a China–Europe bridge: it can become a regional development corridor for the economies through which trade passes.

This second interpretation is crucial.

A railway that merely transports Chinese goods across Central Asia creates transit revenue.

A railway connected to industrial zones, logistics centres, processing facilities and export manufacturers creates industrial development.

The same distinction applies to ports.

Aktau is not valuable merely because ships can dock there. Its value increases when port capacity is connected to railways, customs systems, warehouses, manufacturing clusters and international markets.

Infrastructure therefore creates economic value through connectivity plus production.

The EU's Global Gateway strategy increasingly reflects this logic. EU engagement in Central Asia focuses on the Trans-Caspian Transport Corridor, digital connectivity, energy and climate, water and critical raw materials.

The challenge is to ensure that infrastructure investment produces local productive capacity rather than simply facilitating the movement of external commodities.

10.14 The geopolitical position of Central Asia

Central Asia's geopolitical importance has traditionally been explained through the concept of a “Great Game”: a competition among external powers for influence over a strategically located region.

That interpretation remains relevant, but it is increasingly incomplete.

The region is not simply an object of geopolitical competition. Central Asian states are themselves becoming strategic actors capable of balancing competing external interests.

Kazakhstan, Uzbekistan and other governments increasingly pursue diversified external relationships. China is a major investor and trading partner; Russia remains deeply embedded through migration, trade, security and infrastructure; Türkiye has expanded its economic and cultural presence; the Gulf states are increasing investment; and the EU is becoming more important as a source of investment, technology, standards and market access.

This creates a multi-vector environment.

The region's strategic significance has also increased because of the war in Ukraine. Disruptions to traditional Eurasian transport and energy networks have encouraged governments and firms to explore alternative routes. The Middle Corridor has consequently gained importance not simply as a commercial route but as an instrument of strategic diversification.

At the same time, Central Asia faces vulnerabilities. It remains landlocked, dependent on external markets and exposed to Russian and Chinese economic influence. The EBRD explicitly identifies continued dependence on Russian and Chinese markets as a risk alongside commodity-price volatility and remittance dependence.

The region's geopolitical strategy is therefore increasingly one of diversification rather than alignment.

This creates an opening for Europe.

10.15 Central Asia between China, Russia, Türkiye and Europe

Central Asia's future industrial geography will be shaped by the interaction of four major external economic poles: China, Russia, Türkiye and Europe.

China possesses the greatest structural advantages in terms of geography, trade, infrastructure finance and manufacturing integration. Central Asia is directly connected to China's western provinces, and Chinese firms can integrate Central Asian production into wider Eurasian value chains. China's role is therefore difficult to substitute.

Russia retains substantial influence through historical infrastructure, energy networks, labour migration, financial links, security relationships and established trade connections. Yet the war in Ukraine has altered Russia's capacity to function as the region's uncontested gateway to global markets.

Türkiye occupies a different position. Its influence derives from language and cultural links with several Central Asian states, commercial relationships, construction firms, transport connectivity and its position as a gateway to European markets. Türkiye is particularly relevant to the Trans-Caspian corridor because it connects Central Asia to the European customs and transport space through the South Caucasus.

Europe's position is different again.

The EU does not possess China's geographical proximity or Russia's historical embeddedness. Nor does it have Türkiye's linguistic and cultural proximity. Its comparative advantage lies instead in capital, technology, standards, advanced manufacturing, market access, regulatory expertise and long-term institutional investment.

This distinction is important for European industrial policy.

Europe does not need to “replace” China or Russia in Central Asia. Such an objective would be unrealistic and potentially counterproductive. Instead, European strategy should seek to become an important partner in the diversification and upgrading of Central Asian value chains.

The EU's 2025 decision to establish a strategic partnership with Central Asia represents an important institutional recognition of this opportunity. The partnership includes transport, critical raw materials, energy, water, digital connectivity and investment, while the €12 billion Global Gateway package provides a financial framework for deeper engagement.

The relationship is becoming increasingly concrete. In 2026, EU and Kazakhstan leaders reaffirmed cooperation in critical raw materials, energy, transport, digitalisation and emerging technologies, highlighting the growing importance of connectivity, energy security and resilient supply chains.

The strategic opportunity for Europe is therefore not simply to import Central Asian resources.

It is to co-invest in Central Asian industrialisation.

That means moving from a commodity relationship towards a value-chain relationship.

Instead of importing raw copper, Europe can support processing.

Instead of importing raw minerals, it can support refining and responsible supply chains.

Instead of merely purchasing renewable energy, it can invest in renewable generation, grids, storage and industrial consumers.

Instead of treating the Middle Corridor as a transit route, it can support logistics, digitalisation and manufacturing along the corridor.

Instead of treating green hydrogen as an export commodity, it can support hydrogen-based fertilisers, chemicals and low-carbon industrial production.

Instead of treating Central Asia as a collection of bilateral markets, it can support regional integration and cross-border production networks.

This is the basis for a European industrial strategy towards Central Asia.

The broader significance of the region lies precisely in the interaction between its assets. Minerals alone do not create an industrial economy. Energy alone does not create an industrial economy. Transport corridors alone do not create an industrial economy. Labour alone does not create an industrial economy.

But minerals + energy + infrastructure + labour + capital + technology + markets + connectivity can create one.

Central Asia is increasingly assembling these components.

The region should therefore be understood as an emerging industrial platform rather than a passive resource frontier.

This does not mean that industrialisation is inevitable. The

region continues to face serious constraints: weak institutions, limited access to finance, infrastructure bottlenecks, water scarcity, environmental degradation, dependence on commodities, state dominance in important sectors and geopolitical exposure. Nor should the rhetoric of strategic partnership obscure the asymmetry of bargaining power between Central Asian states and larger external economies.

The central development challenge is to ensure that foreign investment generates domestic capabilities rather than enclave extraction. This requires local supplier development, skills formation, technology transfer, competition, transparent procurement and institutions capable of capturing and reinvesting resource rents.

The distinction between extraction and industrialisation is therefore ultimately a distinction between ownership of resources and ownership of capabilities.

A country may possess enormous mineral wealth and remain poor if it exports unprocessed resources and imports sophisticated manufactured goods. Conversely, a country with fewer natural resources can generate substantial prosperity if it develops technological, manufacturing and organisational capabilities.

Central Asia's strategic opportunity lies in moving from the first model towards the second.

The European Union can contribute to this transition because its own industrial-policy transformation increasingly emphasises resilience, diversification, critical raw materials, clean technology and strategic supply chains. Central Asia's transformation and Europe's industrial transformation therefore have the potential to become complementary.

The relationship can be represented as a reciprocal industrial chain:

Central Asian resources and energy → European capital and technology → regional processing and manufacturing → integrated Eurasian value chains → expanded markets → higher productivity and industrial capacity.

The logic is therefore not that Europe needs Central Asia merely because Europe needs resources. Nor is it that Central Asia needs Europe merely because it needs investment.

The deeper proposition is that both sides possess complementary assets required for a new industrial geography.

Central Asia supplies resources, energy potential, geography, labour and growing markets. Europe supplies capital, technology, standards, advanced industrial demand and access to one of the world's largest high-value markets. The strategic opportunity lies in combining these assets rather than treating them as separate transactions.

The region's future will ultimately depend on whether it can convert geography into connectivity, resources into value chains, energy into productive capacity and demographic growth into skilled employment.

If it succeeds, Central Asia will no longer occupy the conventional position of a resource periphery located between larger powers.

It will occupy a more consequential position: an emerging industrial space connecting Europe and Asia, supplying strategic resources, generating new manufacturing capacity, producing clean energy and providing alternative routes through an increasingly fragmented global economy.

That transformation also changes the meaning of European engagement. The relevant policy question is no longer simply how Europe can secure access to Central Asian commodities. It is how Europe can participate in the construction of a resilient, diversified and higher-value Central Asian industrial ecosystem.

The distinction is fundamental.

A resource periphery exports what it possesses. An industrial space develops what it can become.

Central Asia is increasingly moving from the former towards the latter.

Analytical Synthesis: From Resources to Industrial Space

There is, at first sight, something deceptively simple about Central Asia's economic geography. The map seems to tell a familiar story: vast territories, abundant minerals, great rivers and reservoirs of energy, railways stretching across the steppe, and, beyond them, the immense markets of China, Russia and Europe. It is tempting, therefore, to see the region as a place from which resources are taken and through which goods merely pass.

Yet this familiar picture becomes less convincing the closer one looks.

The more important question is not what Central Asia possesses, but what it is becoming capable of producing.

This distinction lies at the heart of the present analysis. A region rich in oil, gas, uranium or copper may remain a resource periphery if it exports these commodities with little domestic processing, imports the machinery required to extract them and captures only a small proportion of the value generated along the wider production chain. But the same resources can become the foundation of industrial development when they are joined to electricity, infrastructure, capital, technology, skills and markets.

The difference is subtle in appearance, but profound in economic consequence.

It is the difference between having resources and possessing productive capabilities.

The preceding analysis therefore suggests that Central Asia should be understood not as an industrial space already completed, but as a region in which the conditions for such a space are gradually coming together. The empirical task is to determine how far this transformation has proceeded, where it is strongest, and whether the different elements of the emerging industrial system reinforce one another.

From an analytical framework to measurable dimensions

The first element of this transformation is investment.

No industrial structure can be created without capital. Roads must be built, electricity networks modernised, mines developed, factories constructed, research financed and workers trained. Yet the amount of capital entering a country tells us relatively little by itself. What matters is what the capital makes possible.

A useful starting point is therefore investment mobilisation.

European grants, EIB and EBRD finance, Member-State resources, sovereign investment and private capital should not be regarded merely as financial flows. They are potential catalysts. Their significance lies in whether they induce investment that would otherwise not have taken place.

The empirical question is consequently one of additionality.

If one euro of public finance attracts several euros of private investment, the significance of that euro is greater than its nominal value suggests. If, however, public finance merely replaces investment that firms or governments would have undertaken in any case, its transformational effect is much smaller.

Investment must therefore be followed through the system.

The next question is what it produces.

Factories, renewable-energy facilities, electricity grids, railways, logistics centres, processing plants, research facilities, industrial parks and skilled workers are not outcomes in the final sense. They are productive outputs. They constitute the physical and human foundations upon which subsequent economic change depends.

Here the distinction between extraction and industrialisation becomes visible.

The export of unprocessed copper tells us that a country possesses copper. A domestic copper-processing facility tells us something more. A plant producing copper components tells us more again. And a network of firms producing machinery, electrical equipment and technologies around that industry tells us that a genuine industrial ecosystem may be emerging.

The same principle applies to energy.

A gas field is a resource.

A power station is productive infrastructure.

A reliable electricity system is an industrial foundation.

A renewable-energy system supporting competitive manufacturing is an industrial capability.

The analytical framework must therefore follow the movement from resource endowment to productive capacity.

The importance of productivity

Yet productive capacity alone is insufficient.

A country may build factories without becoming substantially more productive. It may increase output simply by employing more workers or extracting more resources. Such expansion can be considerable, but it does not necessarily constitute structural transformation.

This makes productivity a central dimension of the analysis.

Productivity captures the extent to which capital, labour, technology and organisational capacity are being combined more effectively. It allows the empirical analysis to distinguish between an economy that is merely becoming larger and one that is becoming more capable.

This distinction is particularly important for Central Asia.

The region possesses large reserves of labour and natural resources. Its long-term economic prospects will depend less on the continued expansion of these extensive factors than on the ability to increase the productivity with which they are employed.

Technology therefore matters.

Skills matter.

Infrastructure matters.

Management capabilities matter.

So does the ability of domestic firms to enter the supply chains of larger international companies.

Industrialisation is consequently not a collection of factories scattered across a map. It is a process through which capabilities accumulate.

Competitiveness and the opening to external markets

The accumulation of capabilities must eventually find expression in markets.

An industrial economy cannot remain permanently dependent upon a protected domestic market, particularly where domestic populations are relatively small. Firms must reach regional and international consumers.

This introduces the dimension of competitiveness.

Competitiveness should not be reduced to the price of a particular commodity. It should be understood more broadly as the capacity to produce goods and services that can survive competition in regional and global markets.

Export diversification, manufacturing exports, product sophistication, participation in global value chains and the development of domestic suppliers consequently become important empirical indicators.

Here infrastructure assumes an importance that is sometimes obscured by its physical appearance.

A railway is simply steel and concrete until one asks what it does.

If it merely carries minerals from a mine to a port, its developmental effect may remain limited.

If it connects mines to processing plants, factories to suppliers, industrial zones to cities and Central Asian producers to European markets, its economic significance becomes much greater.

Infrastructure becomes valuable not because goods move along it, but because productive relationships form around it.

The Middle Corridor illustrates this distinction particularly well. Its significance lies not simply in providing another route between China and Europe, but in whether the corridor encourages logistics, processing, manufacturing and trade along its path.

A corridor can therefore be a transit route.

Or it can become an industrial corridor.

The difference is determined by what happens beside the railway.

Resilience and the changing meaning of interdependence

The economic geography of Central Asia has also acquired a new significance because the meaning of interdependence has changed.

For much of the post-Cold War period, dependence upon external markets was generally understood through the language of efficiency. The cheapest supplier was often the preferred supplier; the shortest route was often the preferred route.

Recent geopolitical shocks have made this calculation less comfortable.

A supply chain can be efficient and vulnerable at the same time.

This gives strategic resilience a central place in the analytical framework.

Resilience does not mean that Central Asia or Europe should seek complete self-sufficiency. Such a goal would be neither realistic nor desirable. Rather, it means possessing enough alternative suppliers, routes, technologies and productive capabilities to withstand disruption.

For Central Asia, diversification can reduce excessive dependence upon any single external market or transport route.

For Europe, diversification can provide alternative

sources of critical minerals, energy and industrial inputs.

Thus the same process can produce resilience on both sides.

This is one of the reasons why Central Asia has become more important to European industrial policy.

The sectors in which the transformation becomes visible

The transformation is most clearly observed in several sectors where resources, technology, infrastructure and markets meet.

Critical minerals provide the first and perhaps most obvious example.

Central Asia possesses uranium, copper, chromium, zinc, graphite, gold and other strategically significant resources. But the central empirical question is not how much lies underground. It is how much value is retained above ground.

Are minerals simply extracted and exported?

Are they refined?

Are they processed?

Are components produced locally?

Are domestic firms entering the associated supply chains?

The further the region moves along this sequence, the stronger the evidence of industrialisation.

Energy provides the second foundation.

The region's traditional fossil-fuel resources remain important, but the emergence of large-scale renewable generation introduces another possibility: energy itself can become the foundation for new industrial activity.

This is particularly significant where abundant renewable electricity can support energy-intensive production.

Here renewable energy becomes more than an environmental policy. It becomes an industrial policy instrument.

The relevant empirical question is therefore not simply how many solar panels or wind turbines have been installed. It is whether they improve electricity reliability, lower industrial costs and make new forms of production economically viable.

Green hydrogen occupies a more uncertain but potentially important place in this structure.

The most interesting possibility may not be the export of hydrogen itself. It may be the use of renewable electricity and hydrogen to produce fertilisers, ammonia, chemicals, metals and other industrial products.

In such a model, Central Asia would not merely export clean energy.

It would export products embodying clean energy.

That distinction could become important for the region's ability to capture value from the green transition.

Manufacturing, however, remains the decisive test.

Resources, energy and infrastructure can create the conditions for industrialisation, but manufacturing reveals whether those conditions are actually being converted into productive capabilities.

Kazakhstan's metallurgy and machinery, Uzbekistan's automotive, textile and chemical industries, Kyrgyzstan's light manufacturing, Tajikistan's aluminium and agro-processing, and Turkmenistan's petrochemical activities all provide different starting points.

The empirical task is to determine whether these activities are becoming deeper, more technologically sophisticated and more integrated with domestic suppliers.

If they are, the region is moving beyond extraction.

If these linkages are not established, however, the language of industrial transformation risks remaining largely rhetorical. Industrial development cannot be reduced to the announcement of sectors, the attraction of isolated investments, or the extraction of individual resources. It requires the construction of productive relationships between them.

Regional integration as an industrial mechanism

There is, moreover, a feature of Central Asia that deserves particular attention: the region's industrial future cannot be understood entirely within national borders. The five economies differ considerably in their resources, productive structures, levels of development, and institutional capacities. Yet precisely because of these differences, they possess the possibility of complementarity.

Kazakhstan brings capital, mineral resources, energy and geographical scale. Uzbekistan contributes a large population, an extensive labour force, substantial

manufacturing potential and the region's largest domestic market. Kyrgyzstan and Tajikistan possess significant hydropower resources, together with opportunities in agriculture, minerals and specialised forms of production. Turkmenistan possesses vast gas reserves and considerable petrochemical potential.

Considered separately, each economy faces significant structural constraints. Considered together, however, these economies begin to resemble the constituent elements of a regional production system. Resources in one country can provide the energy or inputs required for production in another; transport infrastructure can connect producers to markets; electricity can move across borders; labour and capital can follow productive opportunities; and specialised industrial capabilities can develop where the economic conditions are most favourable.

Regional integration should therefore be understood not merely as a diplomatic aspiration or a question of trade policy, but as an industrial variable in its own right.

The economic significance of integration lies in the productive possibilities that it creates. Larger effective markets enable firms to achieve economies of scale that may be impossible within relatively small national markets. Cross-border electricity trade can improve the efficiency and resilience of regional energy systems. Integrated transport networks can reduce logistics costs and improve access to external markets. Greater specialisation can allow individual economies to concentrate resources in activities where they possess comparative or emerging productive advantages, while regional supply chains can connect these specialised activities into more complex forms of production.

The relevant question, therefore, is not simply whether the Central Asian states trade more with one another.

It is whether they increasingly **produce together**.

That distinction is fundamental. Trade integration exchanges goods across borders. Industrial integration connects productive capacities across borders. The latter creates a deeper form of economic interdependence because it embeds countries within common production processes rather than merely linking them through final-goods markets.

From industrial sectors to an industrial system

At this point, the separate strands of the analysis begin to converge. Critical minerals cannot be considered independently of energy. Energy depends upon infrastructure. Infrastructure determines the movement of goods and people and therefore conditions manufacturing. Manufacturing depends upon skills, technology and access to finance. And manufacturing cannot reach international markets without reliable logistics and transport.

These relationships compel us to reconsider what we mean by industrial development. Industry is not a collection of separate sectors, each advancing according to its own logic. It is a system. Its strength lies not in the existence of individual capacities, but in the connections between them. Energy without industry leaves power unused. Minerals without processing leave value abroad. Infrastructure without production becomes merely a corridor. Capital without technology creates dependence rather than capability.

The question, therefore, is not simply **where investment goes, but what investment makes possible**.

This requires a more demanding empirical test. We must ask not merely whether capital is being committed, factories constructed, railways extended, or resources extracted, but whether each intervention strengthens the productive capacity of the others.

Does additional renewable electricity make possible new energy-intensive manufacturing?

Does a better railway merely move goods more efficiently, or does it make mineral processing and manufacturing economically viable where they were not viable before?

Does the extraction of mineral wealth lead to refining, processing and downstream production within the region—or does the greater part of the value remain beyond its borders?

Does foreign investment merely extract returns, or does it create domestic suppliers, transfer technology, develop skills and establish capabilities that remain after the investor has gone?

Does infrastructure investment merely consume public resources, or does it create the conditions under which private capital becomes willing to invest?

Does regional integration merely increase the volume of trade, or does it permit firms to operate at a scale that no individual Central Asian market could sustain?

And does European finance simply finance individual projects, or does it mobilise additional investment, reduce risk and create productive activity that would not otherwise have taken place?

These are not secondary questions. They are the test of whether industrial policy is producing transformation or merely producing activity.

For a country may extract more minerals and yet remain no more industrial. It may build more roads and yet manufacture no more. It may attract more foreign capital and yet acquire no greater technological capacity. It may generate more electricity and yet create no new productive advantage.

The decisive measure is therefore the connection between investments.

Does one investment make the next investment more productive? Does one capability create another? Does one sector strengthen the others?

Only when the answer becomes increasingly affirmative can investment be said to be generating an industrial system rather than a collection of disconnected projects.

The ultimate objective is not activity for its own sake. It is the creation of a self-reinforcing productive structure: energy enabling manufacturing; infrastructure enabling production; minerals enabling processing; technology enabling higher-value production; finance enabling investment; and regional integration enlarging the market upon which the entire structure can develop.

That is the difference between development measured in projects and development measured in productive power.

And, ultimately, do these processes translate into higher productivity, stronger productive capacity and higher potential GDP?

These questions transform the analysis. Instead of producing a catalogue of sectors and projects, they allow the analysis to examine the causal relationships through which industrial transformation takes place.

That distinction matters. A railway is not industrial transformation merely because it is built. Its industrial significance depends upon whether it lowers transport costs, enables new production, connects firms to suppliers and markets, and induces investment that would otherwise not have occurred. A mineral deposit does not constitute industrial development merely because it is extracted. Its significance depends upon whether extraction becomes connected to processing, manufacturing, technological development, skills and domestic value creation.

Industrial policy must therefore be judged by the productive relationships it creates, not simply by the volume of resources mobilised or projects announced.

The European connection

This framework also changes the way Europe's relationship with Central Asia should be understood. Europe's interest in the region is frequently described through the language of critical raw materials. That description is correct, but it is incomplete.

Europe requires secure and diversified access to resources. Central Asia requires capital, technology and access to sophisticated markets.

Europe seeks to diversify and strengthen its supply chains. Central Asia seeks to develop productive capacities capable of moving beyond the export of unprocessed resources.

Europe requires resilient transport and energy connections. Central Asia requires connectivity that reduces its dependence upon individual routes, markets and external powers.

The relationship therefore contains a potential industrial complementarity that extends well beyond the simple exchange of raw materials for European capital. Europe's industrial strategy increasingly requires secure, diversified and resilient external supply chains; Central Asia's development strategy requires investment that can transform natural-resource endowments into broader productive capabilities.

The strategic opportunity lies precisely at this intersection.

The objective should not be for Europe merely to secure access to Central Asian resources, nor for Central Asia merely to attract European investment. The more ambitious objective is to construct **interdependent value chains** in which European capital, technology, standards and markets contribute to the development of Central Asian productive capacity, while Central Asian resources, energy, connectivity and emerging industrial capabilities contribute to the resilience and competitiveness of European industry.

Such an approach would also alter the meaning of partnership. Partnership would cease to be measured primarily by the number of agreements concluded, the volume of trade recorded, or the amount of finance committed. Its deeper measure would be whether these relationships generate productive capacity that neither side could have developed as efficiently in isolation.

The question is therefore not simply whether Europe and Central Asia can trade more.

It is whether they can build industrial capacity together.

That is the point at which economic partnership becomes industrial strategy—and at which the language of strategic connectivity acquires an economic substance capable of enduring beyond individual projects, political cycles and commodity prices.

The EU's own industrial-policy transformation increasingly emphasises resilience, strategic supply chains, clean technology, critical materials and economic security. Central Asia is simultaneously attempting to diversify its economy, expand manufacturing, develop renewable energy and strengthen its position between major markets.

The two processes can therefore meet. But the most productive point of convergence is not a simple buyer–seller relationship. It is an industrial partnership.

This distinction matters. A commodity relationship asks a relatively narrow question: how much copper, uranium, gas, or graphite can Europe obtain? An industrial partnership asks a broader and more consequential question: what processing, manufacturing, technological, and logistical capabilities can Europe and Central Asia develop together?

The second question is more ambitious because it shifts the focus from the extraction of existing resources to the creation of productive capabilities. In this sense, industrial cooperation can become a mechanism through which resource endowments are transformed into investment, productivity gains, technological upgrading, and ultimately higher long-run growth.

This provides the basis for the empirical analysis that follows.

The objective is not simply to measure the volume of capital mobilized or the value of trade generated. It is to examine whether these relationships alter the productive structure of the economies involved. The empirical chapters therefore consider several dimensions that are closely interconnected.

Investment leverage asks whether public and international financing succeeds in crowding in private capital and generating additional productive investment.

Industrial output asks whether this investment translates into new productive assets, processing capacity, infrastructure, and manufacturing activity.

Productivity asks whether these assets increase the efficiency with which capital, labour, and technology are combined, and whether they contribute to technological upgrading.

Competitiveness asks whether firms and sectors benefiting from these investments can move beyond protected or domestic markets and compete in regional and global value chains.

Strategic resilience asks whether greater diversification of suppliers, production networks, and logistics reduces exposure to external disruptions and concentrated dependencies.

Strategic autonomy goes one step further. It asks whether governments and firms acquire a broader set of economic and technological options, thereby increasing their capacity to respond to shocks and changing international conditions.

Finally, **GDP impact** asks whether these transformations are sufficiently large to affect aggregate economic performance. The relevant mechanism is therefore not simply that additional trade raises GDP, but that investment and industrial cooperation can expand productive capacity, stimulate productivity growth, and generate positive spillovers across the economy.

The empirical question is consequently whether industrial partnership can transform resource complementarity into sustained capability accumulation—and, through this channel, into higher long-run growth.

These dimensions can be placed within a single causal sequence:

finance → investment → productive assets → productivity → competitiveness → resilience → strategic capacity → potential GDP.

But the sequence should not be imagined as a straight road.

It is more like a landscape in which one road joins another.

Investment in infrastructure can attract manufacturing. Manufacturing can increase electricity demand. Electricity investment can attract further manufacturing. Manufacturing can generate skills. Skills can attract technology-intensive firms. Technology can raise productivity. Higher productivity can attract investment again.

The system therefore contains feedback loops

Success in one part of the system creates the conditions for success elsewhere, while failure can propagate through the system in the opposite direction. A railway without an industrial base remains underutilised because there is insufficient productive activity to generate demand. A factory without reliable and affordable electricity becomes uncompetitive. A mineral deposit without domestic processing capacity remains an enclave, generating limited value beyond extraction. A renewable-energy project without adequate transmission infrastructure cannot translate generation capacity into industrial production. Similarly, a manufacturing sector without the necessary skills cannot move into more sophisticated and higher-value activities.

These relationships are not isolated dependencies but **mutually reinforcing complementarities**. Investment in infrastructure raises the productivity of industry; industrial expansion increases demand for infrastructure; stronger firms create incentives for skills formation; and a deeper skills base enables firms to adopt more advanced technologies. The process can therefore generate cumulative gains, but it can also produce cumulative weakness when critical components are missing.

Industrialisation is consequently a question of complementarity.

The empirical test

The central empirical proposition of this chapter can therefore be stated simply: **industrial development is strongest where complementary capabilities develop together and reinforce one another over time.** The relevant question is not whether a country possesses individual assets—energy, infrastructure, minerals, technology or skills—but whether these assets are connected within a productive system capable of generating increasing returns.

Central Asia should be regarded as an emerging industrial space to the extent that resources, energy, infrastructure, capital, technology, labour and markets are increasingly being combined into higher-value productive systems.

This proposition can be tested.

If the empirical evidence shows increasing mineral processing, manufacturing diversification, renewable-energy deployment, logistics connectivity, productivity, export sophistication and regional production linkages, then the conventional resource-periphery interpretation becomes increasingly inadequate.

If, on the other hand, investment remains concentrated in extraction and transit, with limited domestic value addition, weak productivity effects and persistent dependence upon a narrow range of commodities and external markets, then the transformation remains incomplete.

The purpose of the empirical chapters is therefore not to assume the conclusion, but to determine how far the transformation has actually travelled. The central question is not simply whether Central Asia possesses resources, but whether those resources are becoming embedded in a wider productive system in which complementary industries, comparative advantages and capabilities reinforce one another.

This requires identifying where such complementarities are economically and technologically compatible. Energy-intensive industries, for example, can build on Central Asia's expanding renewable and conventional energy capacity, while metallurgy and mineral processing can connect its resource base to manufacturing. Petrochemicals can build on existing hydrocarbon resources and chemical expertise, while machinery, engineering and equipment maintenance can develop around mining, energy and transport infrastructure. Agro-processing can build on agricultural production, logistics and food-processing capabilities, while textiles and other light manufacturing can connect agricultural inputs to regional consumer markets. Digital services, logistics and financial services can, in turn, support these productive sectors by reducing transaction costs and connecting firms to external markets.

The question of comparative advantage is therefore not static. An industry may initially be competitive because of access to natural resources, low-cost energy or geographic position, but these advantages can become more valuable when combined with skills, infrastructure, technology and market access. **Complementarity matters because comparative advantages that exist separately may be weak, while compatible advantages can reinforce one another and generate new productive capabilities.**

Central Asia should therefore no longer be asked merely what it can supply to the great economies surrounding it. It should be asked what **productive system it can become**, and which combinations of industries can develop around its existing and emerging advantages.

For Europe, the corresponding question is not merely how to secure access to Central Asian resources. It is whether European capital, technology, industrial expertise and

market access can become part of the region's transition from extraction towards production. The relationship could therefore move beyond a simple supplier–buyer model towards **industrial complementarity**, in which European capabilities and Central Asian resources, energy, markets and geographic position reinforce each other.

The decisive issue, ultimately, is not the quantity of resources beneath the soil, but the **accumulation of capabilities above it**. A resource periphery possesses things. An industrial space learns how to transform them, connect them and build new capabilities around them. The empirical analysis that follows is therefore designed to determine whether Central Asia is beginning to make that transformation, which industries are most capable of driving it, and whether their comparative advantages are sufficiently compatible to generate a self-reinforcing process of industrialisation.

12.Strategic Sectors and Policy Areas

EU industrial policy increasingly focuses on sectors considered strategically important for competitiveness, technological development and economic resilience. This reflects the broader return of industrial policy in Europe, where governments have moved beyond purely horizontal measures towards more targeted interventions in strategic industries (Aiginger & Rodrik, 2020). The distinction between horizontal and vertical industrial policy is particularly relevant: while horizontal policies improve the general business environment, vertical policies target specific sectors or technologies considered strategically important (Veugelers & Sapir, 2019). EU industrial policy increasingly combines these two approaches rather than relying exclusively on either model.

Semiconductors represent one of the clearest examples of this shift. Their importance extends across digital technologies, telecommunications, automotive production and advanced manufacturing. The European Chips Act seeks to strengthen European semiconductor capabilities through investment, research, production and supply-chain resilience (European Parliament & Council of the European Union, 2023). This reflects the growing importance of technological capabilities within industrial policy. It also illustrates how concerns about economic security can justify more targeted industrial intervention.

Critical raw materials constitute another strategic area. European industries depend on resources such as lithium, cobalt, nickel, copper and rare earth elements for batteries, renewable technologies and advanced manufacturing. The Critical Raw Materials Act seeks to strengthen European access to these resources while reducing excessive dependence on individual suppliers (European Parliament & Council of the European Union, 2024a). This approach corresponds with the broader concept of strategic value chains, which emphasises the vulnerability of highly interconnected production systems to external shocks (Montanino et al., 2021). (CEPS)

Clean technologies have similarly become central to European industrial policy. Renewable energy technologies, batteries, electrolysers and other net-zero technologies are increasingly treated as strategic industries because they are necessary for both decarbonisation and future competitiveness. The Net-Zero Industry Act seeks to expand European manufacturing capacity in these areas (European Parliament & Council of the European Union, 2024b). The Clean Industrial Deal reinforces this approach by presenting decarbonisation as a potential source of industrial growth rather than simply as a regulatory constraint (European Commission, 2025b).

The growing emphasis on strategic sectors is also connected to the concept of open strategic autonomy. Strategic autonomy does not necessarily imply economic self-sufficiency. Rather, it involves reducing excessive dependencies while maintaining international economic openness and diversified external partnerships (Alcidi et al., 2023). (CEPS) This distinction is important because EU industrial policy continues to operate within an open trading system. The objective is increasingly to manage vulnerabilities rather than eliminate international interdependence.

Digital technologies, artificial intelligence, advanced materials, robotics, biotechnology and quantum technologies are therefore becoming important components of the EU's strategic industrial agenda. The Competitiveness Compass identifies these technologies as areas in which Europe needs to strengthen innovation and technological capacity (European Commission, 2025a). This reflects the argument that contemporary industrial policy increasingly concerns the development of technological ecosystems rather than simply supporting individual manufacturing sectors.

The strategic-sector approach also creates important institutional challenges. A genuinely European industrial policy requires coordination between EU institutions and Member States because national governments retain significant powers over taxation, investment, infrastructure and industrial support. CEPS argues that a stronger European industrial policy requires a combination of regional specialisation and central coordination rather than a simple choice between market-

based approaches and national industrial champions (CEPS, 2024). (Ceps) This reinforces the idea of EU industrial policy as a form of multilevel governance.

The selection of strategic sectors nevertheless creates tensions between competitiveness, strategic autonomy and market openness. Targeted intervention can strengthen European capabilities, but excessive protectionism or fragmentation may increase costs and reduce efficiency. Recent research therefore emphasises the need to balance resilience and security with the benefits of international economic integration (Alcidi & Kiss-Gálfalvi, 2023). (CEPS) The strategic-sector approach should consequently be understood as an attempt to manage economic dependencies rather than to eliminate them.

Overall, the emergence of strategic sectors demonstrates the transformation of EU industrial policy from a predominantly horizontal framework towards a more targeted and strategic model. Semiconductors, critical raw materials, clean technologies, digital technologies, energy-intensive industries and advanced manufacturing increasingly occupy a central position within this framework. This transformation reflects both the academic revival of industrial policy and the EU's response to geopolitical, technological and environmental pressures (Aiginger & Rodrik, 2020; European Commission, 2025a). The resulting model combines horizontal framework policies with targeted interventions in sectors considered essential to European competitiveness, resilience and economic security.

The European Union possesses considerable industrial power, yet it has historically struggled to translate that economic and technological capacity into sustained strategic influence. Its strengths in pharmaceuticals and life sciences, automotive manufacturing, aerospace and defence, advanced machinery, chemicals, clean technologies, energy systems, and precision engineering constitute significant sources of comparative advantage and provide Europe with capabilities that few other major powers can replicate in their entirety. However, the EU's ability to convert these industrial assets into geopolitical leverage remains constrained by fragmented capital markets, comparatively high energy costs, regulatory and institutional complexity, persistent dependence on external suppliers for critical inputs and technologies, and weaknesses in digital platforms, artificial intelligence, and leading-edge semiconductor production. The central challenge for European industrial policy is therefore no longer simply to preserve competitiveness or defend existing industrial capacity. It is to determine how these specialized capabilities can be deliberately mobilized, integrated, and protected so that economic strength becomes strategic resilience, technological autonomy, and ultimately bargaining power in an increasingly competitive international system. The question is not whether Europe possesses the industrial foundations of strategic power, but whether it can develop the political, financial, and institutional capacity necessary to convert those foundations into geopolitical influence.

The automotive, chemical, aerospace, medical technology, wind, textile and clean tech industries allhave high value and are area of strength of EU industry. The real interesting thing is the EU doesn't have one industrial model. It has at least four: Scale industries: automotive and chemicals.

Technological-sovereignity industries: aerospace, medical technology and advanced energy equipment.

Geen-Industrial industries such as wind, grids, electrification and clean tech.

Design/Knowledge industries: fashion, luxury, technical textiles and high end manufacturing.

The automotive is the biggest EU Industry with a turn over above € 1 trillion and gross value turnover of €273 billion, and extra-Eu exports of 254,7 billion, the main competitive threat being China, EV batteries and software.

The EU chemical industry has a global technological base, but a declining market share the main competitive threat being China, the US and energy costs.

Gross Value added is highest in the wind industry, while automotive and chemicals have ,much larger absolute value but more extensive intermediate-input chains. This gives an interesting EU strategic hierarchy: Automotive-Chemicals-Civil aerospace, Medical technology-Wind-Fashion-Solar manufacturing. Yet if the criterion is strategic sovereignity rather than size, I would rank aerospace, medical technology, chemicals, energy equipment, semiconductors and automotive much higher than their simple turn over ranking suggests.

Figure Europe's Industrial strengths



That suggests that an EU Industrial strategy 2030/2040 should not try to maximise turnover everywhere. It should maximise European value retained per 100 of global demand. The implication could therefore be:

EU Strategic Value Ratio= European Gross Value Added (GVA)+R&D+export surplus+ critical technological capability= global market opportunity. On that basis, aerospace, medical technology, chemicals, automotive, grid/power equipment and probably deserve substantially greater strategic priority that their simple market size would indicate. And there is one glaring policy problem: solar. Europe has enormous demand and deployment, but captures too little of the manufacturing value chain. That is almost the inverse of wind, where Europe retains a much larger industrial and technological share. The priority should therefore be to maximise European value added, technology, exports and resilience, not simply turnover.

Automotive: The EU should accelerate the transition to electric, software-defined and autonomous mobility while protecting European manufacturing through battery capacity, affordable energy, R &D skills, strategic trade policy and competitive supply chains.

Chemicals: Keep the basic chemical backbone in Europe, decarbonise it, and use it to build Europe's Next Generation of high-value industries.

Aerospace: Protect Technological soverernigity through R&D, strategic procurement, defence-civilian synergies, skilled talent, supply-chain resilience and support for European aircraft and space champions.

Medical technology: The EU should strengthen innovation, scale-up and strategic manufacturing, while using procurement, regulation and EIB financing to build resilient European supply chains and reduce dependence on on-Eu technologies.

Semiconductors: The Eu should build technological sovereignity by scaling chip design and advanced manufacturing, securing critical equipment, mobilising public-private investment, and strengthening European leadership in automotive, industrial and AI chips.

Energy equipment: The Eu should secure leadership in grids, storage, hydrogen and power technologies through strategic investment, European lead markets, resilient supply chains and affordable energy.

Grid power equipment: The Eu should build a globally competitive European grid industry by accelerating investment in transformers, cables, substations and smart grid technologies, while securing critical supply chains and scaling EU manufacturing.

If we inquire what makes a polity truly powerful, we shall find that it is not wealth alone, nor arms alone, nor the possession of knowledge, but the prudent union of all these things under a common purpose. In this respect, the European Union possesses resources of no small consequence. Its economic strength, technological capacity, regulatory influence, diplomatic reach and military potential provide the foundations of strategic power. Yet these foundations remain imperfectly joined, for Europe has too often possessed the means to act without possessing the unity necessary to act decisively.

Consider first the Single Market, upon which much of

Europe's influence rests. A community of approximately 450 million people, joined by an extensive and highly integrated economy, possesses a power that cannot easily be disregarded. The rules established in Brussels concerning competition, data, the environment and consumer protection do not remain confined within European borders. Companies throughout the world frequently conform to European standards because the European market is too valuable to ignore. Thus Europe exercises influence not merely by commanding, but by establishing the conditions under which others must conduct their affairs. Yet we should not mistake the power to regulate for the power to lead. Laws may govern markets, but innovation and industry determine who will prosper within them.

Here lies one of Europe's greatest difficulties. European nations possess remarkable scientific institutions, skilled workers and sophisticated industries, particularly in manufacturing, pharmaceuticals, chemicals, aerospace and machinery. Yet Europe has too often failed to transform knowledge into enterprises capable of competing upon the largest global scale. In artificial intelligence, digital platforms, semiconductors and venture capital, others have moved more rapidly. It is therefore not enough for Europe to discover; it must also create, invest and produce. Knowledge that cannot be transformed into economic and technological strength will remain an honourable achievement rather than a source of power.

The same principle applies to the green transformation of the European economy. Europe has the opportunity to lead in renewable energy, batteries, hydrogen and energy efficiency. If properly pursued, this transformation could strengthen European industry while reducing dependence upon foreign energy. But there is a danger in pursuing virtue without prudence. If European production is driven abroad by excessive costs, Europe may achieve environmental progress while surrendering industrial strength. The wise policy is therefore not to choose between climate ambition and competitiveness, but to make each serve the other.

Nor should Europe underestimate the power of commerce and diplomacy. Through trade, investment, development assistance, sanctions and access to its vast market, the Union possesses instruments by which it can influence states far beyond its borders. Yet such influence is secure only when supported by independence. A power that depends excessively upon others for its energy, raw materials, technology or defence will find its freedom of action constrained precisely when it is most needed. Strategic resilience must therefore become an essential companion to economic openness.

Most evident of all is the question of defence. Europe possesses considerable military resources when its nations are considered together, but these resources remain divided among separate armies, procurement systems and political authorities. Greater expenditure is necessary, but expenditure alone cannot create power. Europe must develop common capabilities, strengthen its defence industries, coordinate procurement, improve intelligence and logistics, and, above all, cultivate the political will to act together. Without such unity, Europe may possess considerable strength while remaining uncertain of how to employ it.

Nor should Europe imagine that its purpose is to imitate the United States, China, India or Russia. Each possesses advantages that Europe cannot simply reproduce. America commands extraordinary military and technological power; China possesses immense industrial capacity; India benefits from demographic scale and rapid growth; Russia retains formidable military and nuclear capabilities. Europe need not defeat these powers at their own pursuits. Its strength may instead lie in combining economic scale, technological excellence, regulatory influence, diplomacy and credible defence into a distinctive form of power.

The greatest obstacle, therefore, is not a lack of resources but a lack of unity. The nations of Europe possess wealth, knowledge and capability, but they do not always possess a common strategic purpose. Foreign policy, defence, taxation, energy and industrial policy remain deeply influenced by national interests, and these interests can prevent Europe from responding with the speed and determination demanded by an increasingly competitive world.

The question before Europe is consequently not whether it has the resources of a great power. It does. The question is whether it has the wisdom to unite those resources, the courage to defend its interests and the foresight to prepare for the rivalries that lie ahead. If Europe can give common purpose to its divided strengths, then its influence need not be measured merely by the wealth it possesses, but by the ends to which that wealth is directed. For power is most secure when strength is governed by prudence, and prosperity becomes truly strategic only when a people possesses the unity to preserve it.

The European Union can become a stronger strategic power, but this will depend not merely upon the wealth it possesses, but upon the unity with which that wealth is employed. For what is power if it lies divided, and what strength if it cannot be brought to bear when necessity

demands it? Europe possesses the means: a vast market, considerable wealth, advanced knowledge, industrial capacity and a voice heard across the world. Yet these strengths remain diminished when finance, energy, security and knowledge are divided among nations.

If Europe would make its influence equal to its resources, it must first make itself more coherent. A stronger European financial market would gather the wealth of its citizens and direct it towards innovation, infrastructure and defence. Greater energy integration would free Europe from excessive dependence upon external powers and give it greater resilience in times of crisis. Closer cooperation in defence, supported by joint procurement and common capabilities, would transform the strength of many nations into a more credible European power.

Nor should Europe neglect the power that comes from knowledge. Investment in research, education and artificial intelligence can ensure that European discoveries become European industries. At the same time, a stronger industrial policy and greater protection of critical supply chains in semiconductors, batteries and raw materials would prevent Europe from becoming dependent upon those whom it may one day need to resist.

The question, then, is not whether Europe possesses power, for it plainly does. The question is whether Europeans possess the unity and courage to use that power together. If they can turn their separate strengths into a common purpose, Europe need not choose between prosperity and security, nor between independence and cooperation. It can become a power whose influence rests not upon conquest, but upon the strength of its institutions, the wealth of its people and the common purpose of its nations.

Table

Sector	Direction	Capability	Dependency	Instruments	Connectivity	Governance	Reconfiguration
Pharmaceuticals & Life Sciences	Global export leadership in high-value medicines	Deep R&D base, biologics, advanced production	Reliant on Asia for APIs and precursor chemicals	EU Pharma Strategy, IP and pricing regulation	Cross-border clinical trial and supply networks	EMA, national health agencies, research consortia	Reshoring API production, biotech consolidation
Automotive	Sustaining global market share amid electrification	Largest corporate R&D spend, engineering depth	Battery cells and raw materials sourced externally	CO2 emissions targets, EV mandates, trade tariffs	Pan-European supplier and logistics chains	Manufacturer associations, national ministries	Shift from combustion to EV and software-defined vehicles
Aerospace & Defence	Strategic autonomy in air and space capability	Advanced engineering, systems integration	Some dependence on US components and semiconductors	Export controls, defence procurement rules	Multinational consortia (Airbus-style production)	Intergovernmental defence agencies, primes	Rearmament, dual-use technology integration
Industrial Machinery & Automation	Maintaining leadership in precision engineering	Robotics, automation, machine-tool expertise	Low dependency; net exporter of capital goods	Standards-setting, single-market harmonisation	Dense supplier clusters (Germany, Italy)	Chambers of commerce, engineering federations	Integration of AI and robotics into production lines
Chemicals	Supplying inputs across the industrial base	Sophisticated process engineering, large scale	High dependency on imported energy and feedstocks	REACH regulation, carbon pricing	Integrated with pharma, auto, construction sectors	Industry associations, environmental regulators	Green chemistry transition, energy-cost-driven restructuring
Clean Technologies	Climate leadership and energy transition goals	Strong in R&D; weaker in manufacturing scale	Dependent on China for panels, cells, components	Green Deal instruments, subsidies, carbon border tax	Grid interconnection, cross-border energy markets	EU energy directorates, national regulators	Scaling domestic manufacturing, supply chain diversification
Energy & Power Technologies	Secure, decarbonised energy supply	Fastest-growing R&D investment (19.8%, 2024)	Historic dependency on Russian gas, now diversifying	Energy market regulation, infrastructure funding	Cross-border transmission grids and interconnectors	ENTSO-E, national energy regulators	Grid modernisation, renewables integration
Precision Instruments & Medical Equipment	High-value niche export leadership	Advanced optics, scientific instrumentation	Moderate reliance on specialised electronic components	Medical device regulation (MDR), standards bodies	Tight links to research institutes and hospitals	Notified bodies, sectoral standards organisations	Digitalisation and AI-assisted diagnostics integration

Luxury Goods & Fashion	Global brand and cultural leadership	Craftsmanship, design, brand equity	Dependent on global consumer demand (esp. Asia)	IP protection, counterfeiting enforcement	Artisan supply chains, retail networks	Industry federations, national trade bodies	Digital retail shift, sustainability-driven redesign
Agri-food & Food Processing	Food security and export competitiveness	Advanced processing, quality and safety systems	Reliant on imported fertiliser and animal feed inputs	Common Agricultural Policy, food safety law	Farm-to-processor-to-retail supply chains	Ministries of agriculture, farmer cooperatives	Climate adaptation, precision-farming adoption

The cross-tabulation, once assembled, yields a set of implications that extend beyond the individual cells and speak to the structural condition of European industrial policy as a whole.

The concentration of vulnerability in a single column. Across nearly all ten sectors, the Dependency column carries the heaviest analytical weight — batteries and raw materials in automotive, APIs in pharmaceuticals, feedstocks in chemicals, solar components in clean technology, energy inputs in agri-food. This concentration suggests that European industrial strength is not evenly exposed to external reliance; rather, dependency clusters disproportionately in upstream inputs and critical materials, while downstream capability — engineering, design, integration — remains comparatively robust. The implication is that policy attention directed at "manufacturing competitiveness" in the abstract risks misallocating resources if it does not distinguish between sectors where the EU controls the full value chain and those where strength is confined to final assembly or high-value services layered atop imported inputs.

Capability and Direction are rarely the binding constraint. In every sector examined, the EU possesses articulated strategic goals (Direction) and substantial technological capacity (Capability). The binding constraints instead appear downstream, in Dependency and Reconfiguration. This has a significant implication for policy design: initiatives framed primarily around innovation funding or R&D subsidy — which target Capability — may be addressing a dimension where Europe is already comparatively strong, while underinvesting in the dimensions where structural weakness actually resides.

Instruments are unevenly developed relative to the dependencies they must govern. Regulatory frameworks exist and are often sophisticated (REACH, MDR, the CBAM, the Green Deal architecture), yet they were frequently designed for objectives other than dependency management — environmental protection, market harmonisation, consumer safety — and have only recently been retrofitted toward strategic-autonomy purposes. This retrofitting implies a lag between the emergence of a dependency and the availability of an instrument calibrated to address it, a lag visible in the post-2022 scramble to construct energy and critical-raw-material instruments that did not previously exist in adequate form.

Governance remains predominantly national or sub-EU, even in sectors with pan-European production. Aerospace and automotive exhibit genuinely multinational governance structures (consortia, joint programmes), but chemicals, agri-food, and precision instruments remain governed largely through national ministries and sectoral associations operating within a harmonised but not integrated regulatory space. This implies that Reconfiguration — the structural adaptation required by decarbonisation, digitalisation, or supply-chain diversification — will proceed unevenly across sectors, constrained less by technological readiness than by the fragmented institutional capacity to coordinate change at the requisite scale.

Connectivity functions as a double-edged property. The same dense supplier and logistics networks that generate competitive advantage (industrial machinery, automotive) also transmit shocks rapidly across borders when disrupted, as evidenced during the pandemic and the energy crisis. The implication is that Connectivity should not be treated as an unambiguous strength in policy evaluation; its value is conditional on the resilience of the nodes it connects, and dense integration without redundancy constitutes a latent fragility rather than a settled asset.

A composite implication for institutional design. Taken together, the pattern across sectors suggests that European industrial strength is asymmetric by design dimension — strong in Direction and Capability, uneven in Instruments and Governance, and structurally exposed in Dependency — which argues against a uniform industrial policy applied indifferently across sectors. Instead, the analysis implies a sector-differentiated approach: dependency-reduction measures concentrated where external reliance is most acute (clean-tech components, pharmaceutical APIs, critical raw materials), governance-

integration measures concentrated where fragmentation most impedes coordinated Reconfiguration (chemicals, agri-food), and Connectivity-resilience measures concentrated where network density is highest and therefore most consequential if disrupted (automotive, industrial machinery).

The pattern of implications drawn from the cross-tabulation points toward a coherent, if demanding, programme of action, one best organised along the same seven handles through which the original weaknesses were diagnosed, so that each proposed intervention remains traceable to the specific constraint it is meant to resolve.

The most urgent priority concerns Dependency, which emerged consistently as the sector's binding constraint regardless of how strong the underlying capability or how clear the strategic direction. Addressing this requires establishing joint European mechanisms for procurement and stockpiling of the specific upstream inputs identified as high-risk — pharmaceutical active ingredients, battery raw materials, solar-cell components, and agricultural fertiliser inputs chief among them. Equally important is that co-investment in domestic capacity be targeted precisely at the exposed node of each value chain rather than distributed across it indiscriminately: API manufacturing in pharmaceuticals, cell and component production in clean technology, rather than diffuse subsidy to "green industry" as an undifferentiated category. Supplier diversification should furthermore be written into major public contracts in defence, energy, and health procurement, so that dependency concentration is priced into decision-making as a genuine cost rather than treated as an externality absorbed elsewhere.

A second and closely related priority concerns the modernisation of Instruments, since the analysis suggested a persistent lag between the emergence of a dependency and the availability of a policy tool calibrated to address it. The retrofitting already underway through the Critical Raw Materials Act and the Net-Zero Industry Act should be extended to sectors where equivalent instruments remain conspicuously absent, notably agri-food inputs and specialised medical-device components. Firms above a defined scale threshold might reasonably be required to disclose single-source or single-region dependencies to regulators, following the precedent already established in financial systemic-risk supervision, allowing exposure to be identified before rather than after disruption occurs. Carbon-border and trade instruments should also be explicitly aligned with dependency-reduction objectives, treating decarbonisation and supply-chain security as a single integrated policy track rather than as parallel and occasionally competing agendas.

A third priority lies in the integration of Governance, since fragmentation was shown to slow Reconfiguration precisely where coordination is most needed. In sectors where governance remains predominantly national — chemicals, agri-food, precision instruments — the establishment of EU-level coordination bodies, modelled on the multinational consortia that already function effectively in aerospace and automotive, would represent a more credible path than continued reliance on voluntary harmonisation. Regional and city-level actors, already recognised as legitimate stakeholders within the broader Industry 5.0 framework, deserve a formal channel into sectoral governance as well, given that the consequences of Reconfiguration land disproportionately on regions rather than on firms alone.

Connectivity requires a shift in how it is conceived and managed, treated no longer as a fixed and unambiguous asset but as a variable whose value depends on the resilience of the nodes it connects. The most densely networked sectors — automotive and industrial machinery above all — would benefit from mandated redundancy planning, including dual-sourcing requirements, buffer-stock rules, and contractual diversification clauses, even where such measures introduce some efficiency cost. Mapping should extend beyond first-tier suppliers to the second and third tiers, since the shocks of 2020 to 2022 demonstrated repeatedly that systemic risk tends to reside below the visible contractual surface.

Capability, by contrast, is a dimension where Europe already performs comparatively well, and the corresponding action is one of redirection rather than expansion. Research funding that currently reinforces already-strong capability in engineering and design might usefully be rebalanced toward the specific technologies where Europe combines capability weakness with import dependency — cell chemistry, semiconductor packaging, and active pharmaceutical synthesis in particular. Attaching commercialisation and scale-up conditions to research grants would help ensure that capability gains translate into domestic production capacity rather than remaining confined to the research stage, thereby closing the innovation-ecosystem leakage identified earlier in the analysis.

Direction, too, calls less for new ambition than for sharper sequencing. Given finite fiscal and institutional capacity, formally prioritising sectors by dependency severity and strategic criticality — semiconductors, energy, critical pharmaceuticals, and defence-relevant materials foremost among them — offers a more credible path than pursuing

uniform industrial strategy across all ten sectors simultaneously.

Finally, Reconfiguration should be approached proactively rather than reactively. Regional transition programmes, encompassing retraining, infrastructure investment, and support for small and medium enterprises, ought to be funded ahead of anticipated structural shifts such as the transition to electric vehicles in automotive or the adoption of green chemistry in chemicals, rather than deployed only after plant closures have already occurred. This anticipatory posture draws directly on the social-cohesion argument advanced in the original analysis, using it as justification for early intervention rather than for remediation after the fact.

The logic uniting these seven strands of action is ultimately one of targeting rather than expansion: because Dependency and Reconfiguration are where the cross-tabulation reveals the European Union to be structurally weakest, the greater share of new policy effort belongs there, while Direction and Capability, already comparatively strong across the sectors examined, require principally sharper targeting rather than additional investment.

Analytical Synthesis: Strategic Sectors within the EU Industrial Policy Framework

The examination of Europe's strategic sectors reveals a truth that cannot be concealed by the simplicity of any single legal provision: the industrial strength of the Union does not rest upon Article 173 TFEU alone. It rests upon the combined action of laws, institutions, resources and common purposes. The policy of Europe is therefore not contained in one competence, nor carried by one institution, but formed through the interaction of many. In semiconductors, critical raw materials, clean technologies, energy-intensive industries and advanced digital technologies, we see most clearly how the industrial question has become inseparable from the questions of technology, climate, resilience and security (Aiginger & Rodrik, 2020; Renda, 2024).

The legal foundations provide the authority for action; secondary legislation gives that authority practical form; and institutions give it direction through implementation. The Commission, Parliament, Council and Member States, together with financial institutions and private actors, translate European objectives into regulation, investment, research, State aid and market measures. Thus, the industrial policy of the Union is not the work of one hand. It is a common undertaking in which different institutions exercise different powers towards a growing number of shared strategic ends.

This development is important because it reveals a change in the character of European industrial policy itself. The earlier model relied heavily upon horizontal rules: creating the conditions under which competition could flourish, markets could integrate and firms could compete. Those principles remain essential. But Europe has increasingly recognised that there are moments when the general rules of the market are not sufficient to secure the capabilities upon which the market itself depends. The result is not the abandonment of horizontal policy, but its combination with **targeted strategic intervention** (Veugelers & Sapir, 2019).

The significance of the strategic sectors lies precisely in this combination. Competitiveness is no longer pursued in isolation from resilience; innovation is no longer separated from security; decarbonisation is no longer regarded merely as an environmental objective. These purposes increasingly meet within the same industrial strategy. The semiconductor industry illustrates the point: Europe seeks not merely technological excellence, but also greater security of supply. Critical raw materials are valued not merely as commodities, but as foundations of industrial capacity. Clean technologies are pursued not only for the reduction of emissions, but also for the creation of European manufacturing strength.

What emerges, therefore, is not a collection of separate sectoral policies, but an increasingly interconnected system of **strategic industrial ecosystems**. The strength of one sector depends upon the capabilities of another; energy affects industry, technology affects productivity, raw materials affect manufacturing, and infrastructure affects the movement of all of them. The industrial question has thus become a question of how these capabilities are connected and sustained.

This framework allows the transformation to be examined systematically. An industrial challenge gives rise to a strategic objective; the objective requires a legal basis; the legal basis enables particular instruments; those instruments require institutional coordination; and coordination must ultimately produce measurable outcomes. Legislation, funding programmes and regulatory measures are therefore not the final measure of industrial policy. They are its instruments. The greater test lies in what they produce: investment, productive capacity, technological development, innovation, resilience and, ultimately, stronger European industry.

This distinction is essential. The existence of a European law does not by itself create a factory. A funding programme does not by itself create innovation. A strategy does not by itself create resilience. Between European

decision and European outcome stands the difficult work of implementation. It is here that the cooperation of the Union and its Member States becomes decisive.

For this reason, coordination is not merely an administrative concern; it is a condition of industrial strength. The competences of the Union remain distributed, and the instruments of industrial policy are consequently spread across institutions and levels of government. The Commission may establish frameworks and initiatives; Parliament and Council shape legislation; Member States implement and finance measures; financial institutions mobilise capital; and firms ultimately transform these conditions into productive activity. The success of strategic industrial policy therefore depends upon whether these different powers can be brought into sufficient alignment.

The strategic-sector analysis consequently reveals something greater than the development of individual policies. It reveals the emergence of a new conception of European industrial governance. Europe is neither returning to the central planning of the past nor surrendering industrial development entirely to the invisible hand of the market. It is seeking a middle course: **to preserve the freedom and efficiency of the market while possessing the capacity to act when strategic capabilities are at stake**.

This is the character of the emerging European model: **coordinated strategic intervention**. Regulation establishes the rules; investment strengthens capacity; research advances knowledge; industrial policy directs attention towards strategic weaknesses; and economic-security measures seek to protect the foundations upon which European prosperity depends.

The purpose, ultimately, is not intervention for its own sake. It is to ensure that Europe possesses the capabilities necessary to determine its own economic future. For an industrial policy worthy of the Union cannot be measured merely by the number of laws it adopts or programmes it establishes. It must be measured by whether European firms can innovate, whether European industries can compete, whether strategic supply can be secured, and whether Europe retains the capacity to act when circumstances demand it.

Thus the strategic sectors are not simply examples of contemporary European industrial policy. They are evidence of its transformation. They show a Europe that remains committed to competition and the internal market, yet increasingly willing to act collectively where markets alone cannot guarantee strategic capacity. The emerging model is therefore neither protectionism nor laissez-faire, but a deliberate attempt to unite **market freedom with strategic purpose**.

The analytical framework can therefore be summarised as follows:

Industrial challenge → strategic objective → legal competence → policy instrument → institutional coordination → implementation → industrial outcome.

This framework gives us the means to judge the transformation of European industrial policy not by isolated acts, but by the direction in which those acts collectively lead. For it is not enough to point to one regulation, one programme, or one sector and declare that policy has changed. The question is what all these measures, taken together, are making of European industrial governance.

Here the strategic sectors become more than categories on a policy list. They become evidence. They reveal, in practice, how the Union is responding to the pressures before it: how competitiveness is being joined to resilience, how innovation is being joined to security, and how decarbonisation is being joined to industrial strength.

The significance, therefore, lies not in each measure considered separately, but in the pattern they form together. And that pattern is increasingly clear: European industrial policy is moving beyond a narrow concern with market efficiency towards a broader conception of strategic capacity. The sectors themselves bear witness to this change. They show that competitiveness alone is no longer sufficient; that innovation without resilience is exposed; that decarbonisation without industrial capacity is incomplete; and that economic security has become inseparable from the productive strength of Europe.

The framework therefore allows the analysis to ask the decisive question: **not simply what policies has Europe adopted, but what kind of industrial power are these policies creating?**

13.SWOT Analysis of the European Union's Industrial Profile

The European Union remains one of the world's principal industrial and economic powers, but its industrial position is characterised by a fundamental tension. On the one hand, the Union possesses considerable structural strengths: a large integrated market, a diversified industrial base, significant research and technological capabilities, advanced infrastructure, a highly skilled workforce and substantial regulatory and commercial power. On the other hand, these advantages increasingly

coexist with structural weaknesses relating to productivity, energy costs, access to capital, technological scale-up and strategic dependencies. The EU therefore does not face a simple problem of industrial decline. Rather, it faces a problem of maintaining and transforming an already substantial industrial capacity in an increasingly competitive and geopolitically fragmented global economy.

Strengths

The European Union's most important industrial strength is the scale and institutional depth of its Single Market. With approximately 450 million consumers and around 23 million companies, the Single Market provides European firms with an economic space substantially larger than that of any individual Member State. Its significance extends beyond market size. Common rules, regulatory convergence, free movement and the removal of many internal barriers enable firms to operate across national borders and create economies of scale that would otherwise be unavailable to most European enterprises. The Single Market therefore constitutes the fundamental internal foundation of the concept of “Union industry” referred to in Article 173 TFEU. The Commission has itself identified the Single Market as one of the EU's principal sources of competitiveness, while simultaneously recognising that remaining internal barriers continue to prevent European companies from exploiting its full potential.

The EU also benefits from an unusually diversified industrial structure. European industry retains globally significant positions in automotive manufacturing, machinery, chemicals, pharmaceuticals, aerospace, engineering, medical technologies, advanced materials and renewable-energy technologies. This diversification provides a degree of resilience because the Union's industrial performance does not depend upon a single sector or technology. European industrial strength is therefore better understood as an ecosystem of interconnected capabilities than as the dominance of one particular industry. This industrial depth remains an important competitive advantage, particularly when compared with economies whose growth is more heavily concentrated in specific sectors.

Another major strength lies in Europe's scientific and technological base. The Union possesses world-class universities, research institutions and public research infrastructures and remains a major global producer of scientific knowledge. It has also developed substantial capabilities in clean technologies. The EU has become an important producer of renewable-energy and other sustainable technologies, providing it with a potential industrial advantage as global demand for decarbonisation technologies increases. The green transition can therefore be understood not merely as an environmental transformation but as a potential industrial transformation, provided that Europe is capable of retaining manufacturing capacity and commercialising the technologies developed within its research system.

Europe's regulatory and institutional environment constitutes another significant strength. The Union's regulatory capacity gives it the ability to influence global markets through standards, product requirements and market-access conditions. This so-called regulatory power can provide European companies with advantages when European standards become international benchmarks. Moreover, the EU's extensive network of international economic relationships gives it considerable collective bargaining power. The Union can negotiate trade agreements and economic partnerships on a scale that would be difficult for most Member States acting individually.

These strengths demonstrate that the EU possesses many of the basic ingredients necessary for a competitive industrial economy. The central question is therefore not whether Europe has an industrial base, but whether it can mobilise, finance, protect and scale that industrial base under changing global conditions.

Weaknesses

The principal weakness of the European industrial model lies in the persistent gap between research capacity and commercial scale. Europe is capable of producing high-quality scientific research and technological innovation, but it has been less successful in transforming those capabilities into companies capable of achieving global scale. The problem is particularly visible in digital technologies and other frontier sectors in which the world's largest companies are predominantly American or Asian. The Draghi Report identified Europe's inability to translate innovation into commercially successful companies and its relative weakness in scaling high-growth firms as central challenges to European competitiveness.

This problem is reinforced by the fragmentation of European capital markets. The Union possesses substantial private savings, but its financial system does not always channel sufficient capital towards innovative companies with high growth potential. European firms can therefore encounter difficulties when attempting to move from research and early-stage innovation to large-scale industrial production. In strategic sectors, this creates the

risk that European intellectual property and entrepreneurial talent will ultimately be commercialised with non-European capital, thereby weakening Europe's ability to capture the economic benefits of its own innovation.

Energy represents another structural weakness. European industry has faced substantially higher energy costs than some of its principal international competitors, placing particular pressure on energy-intensive sectors such as chemicals, steel, aluminium, glass and fertilisers. This problem illustrates why industrial policy can no longer be understood as an isolated policy field. Energy policy, infrastructure policy and industrial policy increasingly overlap in their economic consequences. If energy prices determine whether European factories remain competitive, then energy security and industrial competitiveness become functionally inseparable.

The Union also continues to face significant fragmentation. Although the Single Market provides continental scale, national differences in taxation, regulation, financing, infrastructure and industrial support can prevent European companies from operating with the same degree of scale and coherence as competitors supported by more centralised economic systems. Differences in fiscal capacity are particularly significant. Member States do not possess equal resources to support strategic industries, creating the possibility that industrial investment will become concentrated in countries with greater fiscal capacity rather than where it is economically or strategically most efficient.

Finally, Europe's demographic trajectory creates a long-term structural vulnerability. Ageing populations and shortages in technical, engineering and digital skills can constrain industrial expansion precisely when technological transformation requires additional specialised labour. The problem is therefore not simply unemployment or employment levels but the availability of the particular skills required by advanced manufacturing and strategic technologies.

Opportunities

The transformation of the global economy nevertheless creates significant opportunities for the European industrial model. The green transition is perhaps the most important of these. The global move towards decarbonisation will generate enormous demand for renewable energy, energy-efficient technologies, low-carbon industrial processes, batteries, hydrogen, advanced materials and related infrastructure. Europe already possesses important capabilities in several of these areas. The strategic opportunity is therefore to convert regulatory and technological leadership into industrial and export leadership. The central challenge is ensuring that the production of green technologies takes place in Europe rather than merely creating demand for technologies manufactured elsewhere.

The emergence of strategic technologies provides a second major opportunity. Artificial intelligence, quantum computing, advanced semiconductors, biotechnology, robotics, space technologies, cybersecurity and advanced materials are likely to shape the next generation of industrial competitiveness. The EU has research strengths in many of these fields and increasingly recognises the need to close the gap between scientific excellence and commercialisation. The Competitiveness Compass reflects this evolution by placing the closing of Europe's innovation gap at the centre of its industrial strategy.

A third opportunity concerns the international dimension of industrial policy. Europe can use its commercial and diplomatic relationships to develop strategic partnerships with third countries concerning critical raw materials, energy, technology, infrastructure and supply chains. Such partnerships would allow the Union to diversify sources of supply while simultaneously creating markets for European companies. External economic policy could therefore become an instrument not simply of trade liberalisation but of industrial capacity-building.

This is particularly important in relation to critical raw materials. Europe cannot realistically produce every resource necessary for its industrial transformation within its own territory. The objective should therefore not be complete autarky but managed interdependence. Strategic partnerships can reduce excessive dependence on individual suppliers while preserving the benefits of international trade.

Defence and security also create a potential industrial opportunity. Increasing European investment in defence can generate demand for aerospace, electronics, cybersecurity, artificial intelligence, advanced materials, robotics and space technologies. Because many of these technologies have civilian as well as military applications, defence investment can contribute to broader technological and industrial ecosystems. The EU's recent initiatives to increase European defence investment illustrate the growing convergence between security, technology and industrial policy.

Threats

The greatest external threat to the European industrial model is the increasing technological and industrial competition between the United States and China. The

United States maintains a significant advantage in many digital technologies, venture capital markets and global technology platforms. Europe consequently risks becoming a major market for technologies developed and controlled elsewhere. Such dependence would extend beyond economic considerations because control over digital infrastructure, cloud computing, artificial intelligence and critical technologies increasingly has strategic and geopolitical implications.

China presents a different but equally significant challenge. Its enormous manufacturing capacity, extensive domestic market, state-supported investment and control over important parts of global supply chains give Chinese firms substantial advantages in sectors ranging from clean technologies to batteries, solar equipment and strategic materials. The challenge for Europe is particularly acute because European policy simultaneously seeks to remain an open trading economy while ensuring that strategic industries are not displaced by foreign competition benefiting from structural advantages or state support.

A further threat is the fragmentation of the global economic system itself. The international economy is increasingly shaped by geopolitical competition, sanctions, export controls, investment screening, industrial subsidies and competition over strategic technologies. Economic interdependence can no longer be assumed to operate independently of geopolitical power. Trade, technology, energy and industrial policy are increasingly interconnected with national and European security.

This transformation creates a particular vulnerability for the EU because its economic model is highly dependent on international trade. The Union benefits enormously from openness, but openness also exposes European industry to external shocks, supply disruptions and geopolitical pressure. The strategic objective therefore cannot be to eliminate interdependence. It must be to ensure that interdependence does not develop into structural vulnerability.

The most serious long-term threat is consequently the possibility of gradual deindustrialisation. High energy costs, insufficient investment, technological dependency, international competition and regulatory fragmentation can reinforce each other. Industrial relocation can lead to the loss of investment; the loss of investment can weaken innovation and skills; weaker innovation can reduce productivity; and declining competitiveness can generate further relocation. What initially appears to be a sector-specific problem can therefore develop into a systemic decline in industrial capacity.

Overall assessment

The SWOT analysis suggests that the EU should not be characterised simply as an economy experiencing industrial decline. Such a description would underestimate the scale of its industrial assets. Europe remains a major industrial power with a sophisticated manufacturing base, substantial scientific capacity, a large integrated market, strong infrastructure and considerable regulatory and commercial influence.

Its problem is instead one of strategic conversion. Europe possesses significant assets but does not always convert them into global technological and industrial leadership. The central challenge is to transform research into scale, savings into investment, regulatory strength into industrial advantage, the green transition into manufacturing capacity, and external economic relationships into resilient supply chains.

This diagnosis is directly relevant to the reform of Article 173 TFEU. The existing provision was designed around the objective of ensuring the conditions necessary for the competitiveness of Union industry and expressly recognises that industrial objectives must be pursued through other Treaty policies. The contemporary industrial environment, however, demonstrates that those conditions are no longer exclusively internal. Energy, technology, investment, raw materials, trade, infrastructure and supply chains increasingly determine European industrial competitiveness through their international dimension.

The SWOT therefore provides the substantive justification for a new Article 173. The Treaty should evolve from an essentially internal conception of industrial competitiveness towards a broader conception encompassing competitiveness, resilience and strategic industrial capacity.

The conceptual transition can be expressed in three stages:

The traditional model: competitiveness through an open internal market.

The contemporary problem: competitiveness increasingly determined by external technological, energy, financial and supply-chain conditions.

The proposed constitutional response: competitiveness, resilience and strategic capacity pursued through coordinated internal and external Union policies.

The purpose of a revised Article 173 would consequently not be to turn the EU into a protectionist industrial bloc or to create an unlimited autonomous external industrial competence. Its purpose would be to recognise a fundamental economic reality: in an interconnected and geopolitically contested global economy, the competitiveness of European industry cannot be secured solely within the geographical and regulatory boundaries of the Single Market.

That is the strongest justification for introducing an explicit external dimension into the Treaty framework. It would transform Article 173 from a provision primarily concerned with the conditions of industrial competitiveness into a constitutional provision concerned with the capacity of the Union to maintain industrial competitiveness in the long term.

Cross-Tab SWOT Analysis of the EU Industrial Profile and Implications for Industrial Strategy Choice

A conventional SWOT analysis identifies the principal strengths, weaknesses, opportunities and threats facing European industry. A cross-tab SWOT analysis goes further by examining the interaction between these four dimensions. This is particularly useful for the EU because its industrial challenge is not simply to preserve existing strengths or to respond to external threats. The strategic question is how European capabilities can be mobilised to exploit opportunities, how weaknesses can be corrected before they become vulnerabilities, and how existing strengths can be used to mitigate increasingly external threats.

Figure



1. Strength–Opportunity strategy: turning existing capabilities into industrial leadership

The first strategic combination suggests that Europe should adopt a capability-based industrial strategy rather than attempting to protect every existing industrial activity. The EU possesses substantial assets that can be deployed in sectors where future global demand is expected to grow.

The most important opportunity is the convergence between Europe's existing industrial capabilities and the global demand generated by the green and digital transitions. European strengths in engineering, machinery, chemicals, pharmaceuticals, aerospace, renewable technologies and advanced manufacturing provide a platform from which to develop new strategic industries.

The strategic objective should therefore be to move from comparative strength in established industries to leadership in the next generation of industries.

This requires a stronger connection between research, industrial production and commercialisation. Europe's research capacity is valuable only if it generates firms, technologies, intellectual property, manufacturing capacity and exports. Industrial strategy should

consequently concentrate on the transition from research to scale.

The Single Market is crucial in this respect. It can operate as a European launch market for strategic technologies, allowing firms to achieve scale before competing globally. This would give European industrial policy a different objective from traditional national industrial policy: not merely supporting national champions, but creating European champions and European industrial ecosystems.

2. Strength–Threat strategy: strategic openness rather than protectionism

The second combination is particularly important for the external dimension of EU industrial policy.

Europe's strengths allow it to respond to geopolitical and industrial threats without abandoning its commitment to an open economy. The EU does not need to choose between unrestricted economic openness and protectionism. A third option is strategic openness.

Strategic openness means maintaining international trade and investment while identifying areas in which excessive dependency could create unacceptable economic or security risks. In those areas, European policy would seek diversification, alternative suppliers, strategic stockpiles, technological capacity and international partnerships.

This approach changes the meaning of strategic autonomy. Strategic autonomy should not mean European self-sufficiency. It should mean that Europe retains sufficient capacity to act when external circumstances change.

Critical raw materials illustrate this particularly well. Europe cannot realistically produce every raw material domestically. Its objective should therefore be to combine domestic capacity with diversified international partnerships, recycling, substitution and technological innovation.

This is where trade policy and industrial policy increasingly converge. Trade agreements can become instruments for strengthening European industrial resilience rather than being assessed exclusively according to their immediate effects on market access.

The same logic applies to technology. Europe should remain open to foreign technology and investment where they generate economic benefits, while simultaneously ensuring that critical technological capabilities cannot be entirely outsourced.

3. Weakness–Opportunity strategy: using transformation to correct structural deficiencies

The third combination is arguably the most important for the long-term competitiveness of the EU.

Europe should use the green and digital transitions not simply as policy objectives but as vehicles for correcting its existing industrial weaknesses.

The EU's weakness in scaling technology can, for example, be addressed through strategic public procurement, European-level financing, research partnerships and support for demonstration and first industrial deployment. Similarly, the transition towards clean energy can be used to reduce Europe's exposure to imported fossil fuels while simultaneously creating new industrial demand.

This suggests a shift from a traditional subsidy-based model towards a mission-oriented industrial strategy.

Rather than asking:

Which existing companies should receive support?

industrial strategy should increasingly ask:

Which technological and industrial capabilities will Europe need in ten or twenty years, and what combination of regulation, investment, research, infrastructure and external partnerships is necessary to develop them?

This distinction is crucial because industrial policy can otherwise become defensive. Supporting declining industries indefinitely may preserve employment in the short term while reducing resources available for emerging industries.

A more strategic approach would distinguish between preservation, transformation and creation. Some industries require temporary protection or assistance to transform; others require investment to become globally competitive; and new sectors require early support to emerge.

4. Weakness–Threat strategy: preventing industrial decline

The weakest position occurs when structural European weaknesses interact with external threats.

High energy costs combined with Chinese manufacturing competition can accelerate the relocation of energy-intensive production. Weak venture-capital markets

combined with US technological dominance can encourage European start-ups to seek foreign financing and eventually relocate. Skills shortages combined with rapid technological change can prevent European firms from adopting advanced technologies.

These interactions can produce cumulative effects.

The danger is therefore not a single industrial shock but a self-reinforcing process of industrial erosion:

high costs → lower investment → weaker innovation → loss of scale → reduced productivity → greater dependence → further relocation.

Industrial policy must therefore intervene before these dynamics become irreversible.

This is where the concept of resilience becomes important. Resilience is not equivalent to preserving every existing industrial structure. It means maintaining the capacity to adapt when economic conditions change.

5. Cross-tab conclusion: what kind of industrial strategy does Europe need?

The cross-tab analysis suggests that the EU should not adopt a purely defensive industrial strategy. Nor would a purely horizontal market-based approach be sufficient.

The strategic choice is better understood as a combination of open-market principles with selective strategic intervention.

The EU should preserve the Single Market and competition as the general framework while concentrating intervention on areas where market forces alone are unlikely to produce the industrial capabilities required for Europe's long-term competitiveness, resilience or economic security.

This leads to a selective and strategic industrial policy based on four principles.

First, intervention should be capability-oriented rather than company-oriented. The objective should be to develop European capabilities in technologies, infrastructure, skills, supply chains and production rather than permanently protecting particular firms.

Second, intervention should be European rather than predominantly national where the scale of investment or the strategic importance of the sector exceeds the capacity of individual Member States. Otherwise, differences in national fiscal capacity risk fragmenting the Single Market.

Third, industrial policy should be externally connected. Trade, investment, energy, raw-materials policy, technology partnerships and external relations should be treated as instruments that can contribute to European industrial competitiveness.

Fourth, policy should remain open and competitive. Strategic industrial policy should not become a justification for permanent protectionism, inefficient subsidies or the preservation of non-viable firms.

Implications for industrial strategy choice

The SWOT cross-tab therefore points towards a European strategic industrial model situated between laissez-faire and protectionism.

The choice can be represented as follows:

Table

Strategic model	Main logic	Assessment for the EU
Pure market liberalism	Markets allocate resources; industrial policy remains limited	Insufficient where strategic technologies, externalities and geopolitical dependencies are involved
Defensive protectionism	Protect domestic firms and markets from external competition	Risks higher costs, inefficiency and retaliation; incompatible with the EU's open-market model
National industrial policy	Member States support their own strategic industries	Risks fragmentation and unequal fiscal capacity
Horizontal industrial policy	Improve general framework conditions for all firms	Necessary but insufficient for strategic technologies and dependencies
Strategic/selective industrial policy	Combine open markets with targeted intervention in critical capabilities	Most appropriate for the EU

Full economic sovereignty/autarky	Minimise external dependencies through domestic production	Economically unrealistic and inconsistent with Europe's highly internationalised economy

The preferred model is therefore strategic openness: an industrial strategy that preserves international economic integration while deliberately building the capabilities necessary to prevent excessive strategic dependence.

This has a direct implication for the proposed reform of Article 173 TFEU. The Treaty should not constitutionalise protectionism or European autarky. Instead, it should provide a legal framework for strategic industrial capacity within an open and competitive European economy.

The cross-tab SWOT consequently leads to a broader conception of industrial competitiveness. Competitiveness is no longer simply the capacity of European firms to produce efficiently under market conditions. It increasingly includes the capacity of the Union to innovate, invest, manufacture, access resources, secure energy, control critical technologies, diversify supply chains and maintain the ability to act internationally.

This is the point at which the SWOT analysis becomes directly relevant to Treaty reform. The strategic choice is not between internal industrial policy and external industrial policy. The contemporary industrial challenge requires their integration. Article 173 should therefore reflect the reality that European industrial competitiveness is simultaneously an internal-market objective and an external strategic capability.

14.The Industrial backbone of our livelihood in the future

The central insight from Schumpeter, Carlota Perez and Christopher Freeman is that technological revolutions do not simply create new products; they reorganise entire economies. The next industrial revolution is therefore likely to be built around artificial intelligence, advanced computing, robotics, biotechnology, advanced materials, clean energy, electrification, semiconductors, quantum technologies and autonomous systems.

AI is particularly important because it is a general-purpose technology. It can transform almost every existing industry rather than remaining an industry in itself. Robotics connects AI to physical production, while biotechnology applies advanced computation and biological engineering to medicine, agriculture and manufacturing. Clean-energy technologies represent another technological system, centred on electrification, batteries, grids, storage, renewable energy and new industrial processes.

Perez's framework is especially useful because it suggests that technological revolutions develop in waves. Early investment creates experimentation and speculation, followed by infrastructure construction, widespread adoption and eventually institutional adjustment. The implication for Europe is that the question is not simply which technology will win, but which technological ecosystem will become the foundation of the next period of economic growth.

How do innovation and competition generate productivity and growth?

Here Schumpeter, Paul Romer and Philippe Aghion become particularly important. Innovation increases productivity by allowing the same amount of labour and capital to produce more output or better products. New technologies can therefore increase wages, profits and economic growth while creating entirely new markets.

Romer's contribution is to emphasise that ideas are different from ordinary economic goods. Once knowledge is created, it can often be reused many times. This means that R&D can generate spillovers far beyond the company that originally financed it. This is one of the strongest arguments for public support for research.

Schumpeter adds the idea of creative destruction. New firms and technologies challenge established companies, causing some firms and industries to decline while others grow. This process can be disruptive, but it is also one of the main mechanisms through which economies become more productive.

Aghion adds an important qualification: competition can stimulate innovation. Firms that are protected indefinitely may have less incentive to improve. Industrial policy should therefore generally help firms innovate and scale rather than protect them from competition.

This leads to a crucial distinction for the EU. Supporting Volkswagen's transition to new technology can be industrial policy; guaranteeing Volkswagen's existing market position is much harder to justify.

What should the state and the EU actually do?

This is where Mazzucato, Rodrik and Freeman become particularly useful. The state should not simply wait for

markets to produce the desired technological structure. Markets are powerful mechanisms for allocating resources, but they do not always provide enough investment in basic research, infrastructure, skills, long-term technologies or activities with large social spillovers.

The state can therefore create markets, shape markets and correct coordination failures.

For the EU, this means investing in the foundations that private firms cannot efficiently provide individually. These include electricity grids, digital infrastructure, research infrastructure, education, skills, cross-border transport, capital-market integration and the Single Market.

The EU can also shape strategic markets through regulation, standards, public procurement, R&D programmes, competition policy, trade policy and carefully targeted financing. It can encourage investment in AI, clean technologies, semiconductors, biotechnology, advanced manufacturing and defence-related technologies without deciding in advance which individual company must win.

Rodrik's perspective provides an important discipline: industrial policy should involve experimentation, measurable objectives and mechanisms for withdrawing support when policies fail. Mazzucato provides the more ambitious argument that governments can actively shape technological trajectories around major missions.

For the EU, the best approach is therefore neither pure laissez-faire nor permanent state ownership. It is market-making combined with selective market-shaping.

Why do some regions and industrial ecosystems become globally competitive?

This is where Michael Porter, Alfred Marshall, AnnaLee Saxenian, Richard Nelson, Sidney Winter and Giovanni Dosi become important.

Successful industries rarely emerge from a single company operating in isolation. They emerge from ecosystems containing skilled workers, universities, suppliers, specialised infrastructure, investors, customers, research institutions and complementary companies.

Marshall identified the advantages of geographical concentration more than a century ago. Porter later developed the idea of competitive clusters. Saxenian showed how networks, labour mobility, entrepreneurship and institutional culture helped Silicon Valley develop a different innovation model from more traditional industrial regions.

Nelson, Winter and Dosi add the concept of capabilities. Competitiveness is not simply something that can be purchased with money. It is accumulated through learning, experimentation, organisational knowledge and repeated technological development.

This explains why simply giving a European company €10 billion does not necessarily create a globally competitive industry. The money must be embedded in an ecosystem of research, skills, suppliers, infrastructure, finance, customers and technological capabilities.

The four questions together

Taken together, these questions produce a powerful industrial-policy framework.

The first question identifies the technological wave: AI, advanced computing, robotics, biotechnology, clean energy, advanced materials, semiconductors, quantum and autonomous systems.

The second explains the economic mechanism: innovation raises productivity, while competition and creative destruction move resources toward more productive technologies and firms.

The third determines the role of government: provide public goods, correct market and coordination failures, create markets where necessary and selectively shape strategic technologies without permanently protecting incumbents.

The fourth explains the geography of success: globally competitive industries emerge where technology, capital, infrastructure, skills, research institutions, suppliers and demanding markets form a powerful ecosystem.

The resulting European strategy can be expressed in one sentence:

Europe should not try to pick tomorrow’s corporate winners; instead, it should put its money in the ecosystems that create them—while recognising that strategic competition sometimes requires targeted market-shaping—to maximise productivity, innovation, social welfare, resilience and utility per euro for European citizens.

Which industries will add the most to GDP?

I would put AI and digital technologies at the top for *productivity contribution*. AI is different from a conventional industry because it can raise productivity in

almost every other industry. The biggest GDP effect may therefore come not from AI companies themselves but from AI transforming manufacturing, finance, healthcare, logistics, energy and government. The Commission is explicitly prioritising AI adoption, supercomputing, semiconductors, genomics, quantum and space technologies as productivity-enhancing technologies.

Energy and electricity infrastructure will also have an enormous GDP effect. It is an enabling industry: cheaper and more reliable electricity increases the competitiveness of virtually every other sector.

Advanced manufacturing, robotics and clean industrial technologies should also contribute strongly because they combine capital investment, exports and productivity improvements.

Healthcare and biotechnology will grow because of ageing populations and technological progress. Their GDP contribution is likely to increase, but their greatest economic value may be that they allow people to remain healthier and economically active for longer.

Defence, aerospace and space will probably grow considerably because security has become a much larger economic priority. The EU itself identifies security, defence and space as strategic areas for future capacity.

15.Tommorow's Competitive Industries

Tomorrow's industries will not be built by waiting for tomorrow to arrive. They will be built today, by those who possess the courage to invest before the returns are certain and the outcome is known. Europe stands before a new industrial age, in which machines will think, energy will be transformed, medicine will be redesigned, and factories will increasingly be governed by data and intelligence.

Artificial intelligence will stand among the great general technologies of our time. It will enter the factory, the hospital, the classroom, the laboratory and the public service. Advanced computing will provide the engines upon which this transformation depends. Robotics will give machines greater autonomy and precision. Semiconductors will remain the essential foundations of modern industry. Quantum technologies may open new frontiers in computation, communication and sensing. Biotechnology will transform medicine, agriculture and industrial production. Advanced materials will make possible products and processes that today remain beyond our reach.

But the industries of tomorrow will not be built on intelligence alone. They will depend upon energy. Europe will require electricity in abundance; at a price its citizens can afford and its industries can withstand. The grid will therefore become as important to the twenty-first century as the railway and the port were to the nineteenth. Batteries will store the power of the new economy. Renewable energy will expand its reach. Hydrogen will serve those industries where electricity cannot easily do the work. Clean steel, industrial electrification and carbon-management technologies will determine whether Europe can reconcile prosperity with decarbonisation.

There will also be industries whose importance is measured not merely by their profits, but by the security they provide. Critical minerals, recycling, semiconductor equipment, advanced pharmaceuticals, aerospace and defence technologies will increasingly form part of Europe's strategic foundation. A continent that cannot secure the materials, technologies and knowledge upon which its economy depends will find that economic weakness can quickly become political weakness.

Yet the greatest resource of tomorrow will remain the European citizen. The most sophisticated machine is of little value without the engineer who designs it, the technician who maintains it, the scientist who improves it and the worker who knows how to use it. Education, vocational training, scientific research and lifelong learning must therefore be treated not as secondary social expenditures, but as the foundations of industrial power.

Europe must also understand what industrial policy is not. It is not the permanent protection of companies that have lost their competitiveness. It is not the preservation of every factory in its present form. It is not the distribution of public money to those with the strongest political voice. Industrial policy must instead create the conditions in which productive companies can grow, workers can move into new opportunities, and new industries can emerge.

The European Union possesses a market of enormous scale, but scale alone is not enough. Europe must combine its market with research, capital, infrastructure, energy, skills and technological ambition. It must make markets where markets are fragmented, and shape markets where the strategic interests of Europe demand it. It must invest where one euro can create many euros of economic and social value.

The industries of tomorrow will therefore belong not simply to those who invent, nor simply to those who possess capital, but to those societies capable of combining invention, investment and organisation. Europe must decide whether it wishes merely to consume the

technologies of the future or to build them. The choice is before us: to become a market for tomorrow's industries, or to become one of their creators.

Europe need not fear the industries of tomorrow. But Europe must build them, finance them, educate the people who will lead them, and give them a market in which to flourish. For the future will not be inherited. It will be made.

Table

Priority	Investment return	Investment return	GDP / productivity	Social welfare	Strategic resilience	Utility per euro per citizen	Pool of 130bn allocation
1	Electricity grids & energy infrastructure	Very high	Very high	Very high	Very high	Very high	€27bn
2	AI, digitalisation & public digital infrastructure	Very high	Very high	High	High	Very high	€21bn
3	Skills, education & training	High	Very high	Very high	High	Very high	€18bn
4	Clean industrial technologies	High	High	High	Very high	High	€15bn
5	Frontier R&D & advanced technologies	Potentially very high	Very high	Medium–high	Very high	Medium–high	€11bn
6	Healthcare & biotechnology	High	High	Very high	High	Very high	€10bn
7	Strategic supply chains & critical materials	Medium	High	Medium	Very high	Medium	€8bn
8	Defence R&D & dual-use technologies	High	High	Medium	Extremely high	Medium–high	€8bn
9	Semiconductors	High	High	Medium	Very high	Medium	€7bn
10	Defence & aerospace production/infrastructure	Medium	Medium–high	Medium	Very high	Medium	€5bn
	Total						**€130bn**

Overall assessment

The proposed €130 billion European industrial investment programme should be understood not as a programme for subsidising companies, but as an attempt to build the productive, technological and strategic foundations of the European economy. Its purpose is to increase investment returns, GDP and productivity, social welfare, strategic resilience, and utility per euro for European citizens at the same time.

The largest allocation goes to electricity grids and energy infrastructure, because affordable and reliable energy is a foundation for almost every other industrial activity. Investment in grids, interconnections, storage and smart infrastructure can lower energy costs, support electrification, enable renewable energy and strengthen European energy security. It therefore produces benefits for households, industry and the wider European economy simultaneously.

AI, digitalisation and public digital infrastructure form the second major pillar. Their importance lies in their ability to increase productivity throughout the economy rather than merely expand one particular industry. EU investment should therefore concentrate on computing capacity, data infrastructure, AI adoption, cybersecurity, digital public services and the diffusion of digital technologies into European firms.

Skills, education and training are the human foundation of the strategy. Europe cannot obtain the full return from AI, robotics, advanced manufacturing or clean technologies without engineers, technicians, researchers and workers capable of using them. Investment in skills also has a particularly strong social dimension because it allows citizens to participate in technological transformation rather than simply bear its disruptive effects.

Clean industrial technologies should receive substantial support where decarbonisation and competitiveness reinforce one another. The emphasis should be on industrial electrification, energy efficiency, advanced batteries, power electronics, low-carbon industrial processes, renewable-energy technologies and other areas capable of reducing European production costs while lowering emissions.

Frontier R&D and advanced technologies should provide Europe's long-term technological option value. AI, robotics, quantum technologies, biotechnology, advanced

materials, photonics and other emerging technologies may produce exceptionally high returns, but their outcomes are uncertain. EU policy should therefore tolerate failure in individual projects while maintaining a diversified portfolio of research and commercialisation opportunities.

Healthcare and biotechnology deserve a significant allocation because they combine economic and social returns particularly well. Biotechnology, pharmaceuticals, diagnostics, medical technologies and health-related AI can improve health outcomes, reduce future healthcare costs, create high-skilled employment and strengthen European technological independence. Their value should therefore be measured not only by GDP but also by the improvement in citizens' lives.

Strategic supply chains and critical materials are primarily an investment in resilience. Europe should not seek complete self-sufficiency, which would often be unnecessarily expensive. The objective should instead be diversification, recycling, substitution, strategic capacity and international partnerships in areas where disruption would impose exceptionally large costs on European society.

Semiconductors occupy a similar strategic position. Europe should concentrate on areas in which it possesses technological strengths or where semiconductor capacity is particularly important to European industry, including specialised chips, power electronics, automotive applications, sensors and semiconductor equipment. The objective should be strategic capability rather than complete autarky.

Defence R&D and dual-use technologies should be treated differently from conventional defence expenditure. Defence research can generate spillovers into AI, robotics, cybersecurity, advanced materials, space, telecommunications, sensors and manufacturing. EU funding should therefore concentrate on technologies that strengthen European security while also creating civilian technological capabilities.

This creates an important bridge between civilian and defence industrial policy. Europe's civilian strengths can strengthen its defence capabilities, while defence research can generate technologies with civilian applications. The most valuable investments are therefore those that create capabilities useful to both spheres.

Defence and aerospace production and infrastructure remain strategically important, but they should be distinguished from R&D. Production and procurement primarily provide security capability, whereas R&D can generate broader technological spillovers. Both are necessary, but they should be evaluated according to different criteria.

The final principle is that direct corporate subsidies should remain very limited. The EU should not use industrial policy primarily to preserve individual companies, existing business models or employment structures that have become uncompetitive. Companies should receive support when they contribute to a wider European objective through R&D, clean investment, infrastructure, skills, strategic supply chains or technological development.

This is particularly important for cases such as Volkswagen. The EU should not ask how much money is necessary to preserve Volkswagen's existing employment model. It should ask what investment is necessary to ensure that European automotive technology, workers, supply chains and manufacturing capabilities remain competitive during the transition to the next generation of mobility.

The same principle applies to Airbus, Eni, Iberdrola and Volvo. The relevant unit of analysis should not be the company alone but the European industrial ecosystem surrounding the company.

The proposed €130 billion therefore represents a shift from corporate industrial policy to capability-based industrial policy. The EU would finance the conditions under which successful companies can emerge and compete, rather than attempting to determine in advance which companies must survive.

The distinction between market-making and market-shaping is central. The EU should be a market-maker through the Single Market, infrastructure, standards, competition, capital-market integration, skills and cross-border investment. It should be a market-shaper in a limited number of strategic areas where market failures, coordination problems or security considerations justify intervention.

The strongest investments are those that satisfy several objectives simultaneously. Electricity infrastructure improves productivity, social welfare and resilience. AI and digitalisation raise productivity while improving public services. Skills increase productivity while directly benefiting citizens. Healthcare and biotechnology combine social welfare with high-value innovation. Defence R&D strengthens security while generating technological spillovers. Clean technologies combine competitiveness, environmental objectives and strategic autonomy.

The five objectives should therefore not be treated as

separate silos. The goal is to identify investments where economic return, productivity, social welfare, strategic resilience and citizen utility reinforce one another.

The most important measure is consequently not simply the amount of money spent, nor the number of companies receiving support. It is the additional European value created by each euro of public investment.

The EU should ask whether the investment would have happened anyway, whether it creates benefits beyond the individual recipient, whether it attracts private capital, whether it raises productivity, whether citizens benefit directly or indirectly, and whether it strengthens Europe's ability to withstand future shocks.

Where the answer is yes, the EU should invest boldly. Where the answer is no, it should allow markets to allocate capital.

The ultimate objective is therefore not to protect yesterday's industries, but to build tomorrow's European productive capacity.

Europe should invest in the energy, knowledge, technology, infrastructure, skills, health and security systems upon which future prosperity will depend. It should allow competition to determine which companies succeed within those systems.

In this model, the EU does not pick the winners; it builds the conditions in which European winners can emerge.

16.Industry 5.0: A European Industrial Ambition

Industry 5.0 is not simply the next stage of technological progress; it is a choice about the kind of industry Europe wants to build. It seeks to place human beings, sustainability and resilience at the heart of industrial development, moving beyond the traditional priorities of automation, efficiency and productivity associated with Industry 4.0. The central question is therefore no longer simply how technology can make industry faster and more productive, but what purpose technology should ultimately serve.[3]

The industry 5.o is presented as streamlining in terms of principles the EU Industrial Strategy, whose objective is to:

-achieve climate neutrality by 2050, promote a circular economy and accelerate digital innovation in AI, cloud computing and smart manufacturing.

-reduce dependence on external energy and critical raw materials, support SMEs and strengthen Europe's technological sovereignty and global competitiveness.

-encourage R&D, innovation and sustainable investment while upskilling workers and leverage cities as innovation hubs and empower regions for infrastructure and workforce support.

Key measures include

-digital single market, Intellectual Property protection competition and customs initiatives,

-Climate and sustainability sustainable mobility, the Renovation Wave, Financing the transition CBAM, battery and waste regulations, IPCEIs, sustainable finance and action against foreign subsidies.

-Global Level Playing Field Measures to address foreign subsidies and reinforce the Customs Union.

Overall, the strategy seeks to strengthens Europe's resilience, competitiveness and technological sovereignty while supporting the green and digital transitions and sustainable growth through **collaborative industrial ecosystems** involving governments, local authorities, industries, and research institutions and AI factories.

In summary, the New Industrial Strategy **positions** Europe to navigate global competition, enhance resilience against economic shocks, and maintain geopolitical influence, while achieving sustainable growth. It integrates the European Green Deal and the Strategy on Shaping Europe's Digital Future, reflecting EU values and social market traditions.

The European answer is clear: technology must remain an instrument of human progress. Artificial intelligence, robotics and advanced digital systems should complement human capabilities rather than simply replace them. This human-centric approach places workers' dignity, safety, skills and wellbeing alongside economic performance. Yet Europe cannot pursue industrial prosperity while ignoring the limits of the planet. Sustainability therefore becomes a second pillar of Industry 5.0, requiring European industry to reduce emissions, waste and excessive resource consumption while developing circular and more efficient models of production.

[3] https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/industry-50_en#:~:text=Industry%205.0%20is%20a%20forward-looking%20vision%20for%20European,progress%2C%20while%20leading%20the%20green%20and%20digital%20transitions.

The third pillar is resilience. Recent crises have demonstrated that industrial strength cannot be measured only by productivity or market share. Energy shocks, geopolitical tensions, pandemics and fragile global supply chains have revealed the vulnerability of highly interconnected economies. A resilient European industry must therefore be capable not only of producing efficiently, but also of adapting, recovering and continuing to operate when circumstances change. In this sense, Industry 5.0 represents an attempt to reconcile competitiveness with security and long-term stability.

To achieve these ambitions, the European Union is relying on several complementary means. Research and innovation programmes such as Horizon Europe support the development of artificial intelligence, robotics, sustainable manufacturing and human–machine cooperation. At the same time, the EU recognises that no technological transformation can succeed without people capable of participating in it. Skills, lifelong learning, retraining and education are therefore essential to ensuring that workers are not victims of technological change but active participants in it. The EU also connects Industry 5.0 with the Green Deal, the circular economy and its wider industrial strategy, while the industry 5.0 Community of Practice brings together companies, researchers, universities and policymakers to turn these principles into practical solutions.

This approach has considerable strengths. Its greatest achievement is perhaps **that it refuses to separate economic progress from social responsibility and environmental protection.** It recognises that an industry can be technologically advanced and economically successful while remaining fragile, environmentally damaging or disconnected from the people who make it function. Industry 5.0 therefore offers Europe a broader definition of industrial success: not simply producing more, but producing better, more sustainably and with greater resilience.

Yet we must also recognise its limitations. The greatest challenge is the distance between a compelling vision and measurable industrial transformation. Productivity and production costs can be calculated relatively easily, but human wellbeing, empowerment, resilience and the quality of human–machine cooperation are much more difficult to measure. Without credible indicators, there is a risk that Industry 5.0 becomes a powerful political and corporate slogan rather than a genuine transformation. The European Union has therefore begun developing indicators and assessment tools, but the measurement framework remains a work in progress.

There is also a question of cost. **The transition requires investment in digital technologies, sustainable production, cybersecurity, infrastructure and worker training, and these demands may be particularly difficult for small and medium-sized enterprises**. Europe must therefore ensure that Industry 5.0 does not become a transformation reserved for its largest and wealthiest companies. If the objective is to strengthen European industry as a whole, the benefits and opportunities must reach the entire industrial fabric.

Ultimately, the effectiveness of Industry 5.0 should not be judged by the elegance of its principles, but by the results it produces. It should create industries that are more competitive without becoming less human, more productive without becoming more destructive, and more technologically advanced without becoming more vulnerable. **The European approach is therefore highly convincing as a strategic vision, but its success will depend on Europe's ability to transform principles into investment, investment into industrial change, and industrial change into tangible benefits for workers, companies and society. Industry 5.0 is not merely a technological project; it is an attempt to define what European industrial power should mean in the twenty-first century.**

The European Union’s Industry 5.0 policy emerged from the recognition that technological progress alone cannot guarantee European industrial prosperity. The policy therefore moves beyond the industry 4.0 emphasis on automation, digitalisation and productivity and introduces three complementary objectives: human-centricity, sustainability and resilience.

Human-centricity means that technology should work with and for people. Artificial intelligence, robotics and automation should enhance workers’ capabilities, improve working conditions and support human creativity rather than treating labour simply as a cost to be minimised. Sustainability requires industry to reduce its environmental footprint, use resources more efficiently and contribute to the green transition. Resilience, meanwhile, requires European industry to withstand shocks, adapt to disruption and reduce dangerous dependencies in strategic value chains.

The strength of this policy is therefore its breadth. It does not consider competitiveness, environmental protection and social wellbeing as separate objectives. Instead, it argues that Europe's future industrial competitiveness depends on achieving all three simultaneously. This is particularly relevant after the disruptions of recent years, which demonstrated that an industry can be highly

efficient while remaining extremely vulnerable.

The policy is supported through several means, including research and innovation funding, industrial policy, skills development, sustainability initiatives and cooperation between industry and research organisations. Horizon Europe provides an important financial mechanism, while initiatives such as the industry 5.0 Community of Practice attempt to connect European companies, researchers and policymakers.

However, the policy also has a fundamental weakness: its objectives are easier to define than to measure. It is relatively simple to measure productivity or investment, but much harder to measure worker empowerment, resilience, human wellbeing or the quality of human–machine cooperation. This creates a risk that Industry 5.0 remains a compelling policy narrative without producing sufficiently measurable industrial change.

The 2022 Industry 5.0 Focus Paper

The "Industry 5.0: A Transformative Vision for Europe" Focus Paper gives this policy its deeper intellectual foundation. Published in 2022, it argues that Europe faces a "triple imperative to protect, prepare and transform." The significance of this statement is that the paper does not view Industry 5.0 simply as a technological upgrade; it presents it as a response to wider economic, social and environmental challenges.

The paper's central argument is that European industry needs to move towards a model in which economic growth is no longer the only measure of success. Industrial development should also contribute to human wellbeing, environmental sustainability and societal resilience. In this sense, the Focus Paper is more ambitious than a conventional industrial strategy because it questions the assumptions underlying the existing model of production.

Its greatest strength is therefore strategic foresight. The paper anticipated that European industry would need to deal simultaneously with climate change, technological disruption, resource pressures and systemic shocks. Its emphasis on resilience has become particularly relevant as Europe has experienced energy insecurity, geopolitical tensions and supply-chain disruptions.

But the Focus Paper also exposes a weakness in the early Industry 5.0 approach: the gap between ambition and implementation. It provides a powerful vision of where Europe should go, but it is less precise about how success should be measured and how quickly companies should be expected to transform.

This is why the subsequent development of Industry 5.0 indicators is so important. Between 2022 and 2024, the Commission conducted a pilot study to develop indicators for human-centricity, sustainability and resilience. The study analysed 21 indicators across the automotive and energy-intensive sectors. However, it also found significant gaps in available data, particularly for areas such as human-centric design, organisational innovation and social and environmental innovation.

Table

Area	Evaluation after four years
Strategic vision	Very strong
Policy integration	Strong
Research and innovation	Strong
Human-centricity	Moderate
Sustainability	Strong
Industrial resilience	Strong and increasingly relevant
Skills and workforce transformation	Moderate
SME implementation	Moderate/uncertain
Measurement and indicators	Still developing

Demonstrable industrial transformation	Not yet sufficient evidence

When the policy and Focus Paper are evaluated together, the picture is mixed but generally positive. The EU has been strong in establishing the vision, creating policy coherence and developing supporting research and innovation mechanisms. It has also succeeded in making Industry 5.0 part of the broader European discussion about the green and digital transitions.

However, the evidence for large-scale industrial transformation remains limited. The EU has moved from defining the concept towards developing indicators and practical assessment tools, but it is still difficult to demonstrate that European companies have systematically become more human-centric, sustainable and resilient.

This leads to an important distinction: Industry 5.0 has been more successful as a policy framework than as a demonstrated industrial transformation.

The Focus Paper was therefore successful in diagnosing the problem and establishing an ambitious direction, while the subsequent policy has been successful in building institutions, funding research and beginning to develop implementation mechanisms. The weaker element remains the ability to demonstrate measurable outcomes.

My assessment after the first four years would therefore be approximately 7/10. The EU deserves a high evaluation for strategic vision and policy innovation, but a lower evaluation for measurable implementation. The decisive challenge now is to move from vision → policy → implementation → measurable results.

The indicators are particularly important because they allow us to move from Industry 5.0 as a political vision to Industry 5.0 as something that can actually be measured and evaluated. The European Commission's pilot study, carried out between 2022 and 2024, was specifically designed to identify indicators for the three pillars of Industry 5.0: human-centricity, sustainability and resilience.

In any event, not start-ups but real economy actors are the ones driving transformation, whereas enterpreneurs are strong in innovation.

Indicators of Industry 5.0

For human-centricity, the indicators attempt to measure whether technological transformation is actually improving the position of workers. Relevant dimensions include workers' access to training, digital skills, employment conditions, wellbeing and the extent to which companies invest in people. The Commission's research is important here because simply introducing robots or artificial intelligence does not make an industry human-centric; the question is whether these technologies empower workers and improve the quality of work.

For sustainability, the indicators examine areas such as companies' involvement in low-carbon, circular and clean-energy technologies, sustainability standards and contributions to sustainable development objectives. This gives the EU a way to evaluate whether industrial growth is becoming less dependent on resources and less damaging to the environment. The pilot study found that EU industry already demonstrates strengths in several sustainability indicators, particularly compared with global averages in the energy-intensive industries.

For resilience, the indicators seek to capture the capacity of companies and industrial ecosystems to withstand disruption and adapt to changing conditions. This includes factors connected with innovation, technological capabilities, supply chains and the ability to respond to economic, environmental and geopolitical shocks. This pillar is particularly important for Europe because resilience has become closely connected with strategic autonomy and the security of critical industrial value chains.

The Commission attempted to make these indicators **SMART — Specific, Measurable, Accurate, Robust and Timely**. The study ultimately carried out an in-depth analysis of 21 indicators, using information from company databases, patent databases, labour-force surveys, innovation surveys and Eurostat.

However, the most revealing finding is that Industry 5.0 remains at an early stage of adoption. The Commission's pilot study estimated that only around 5–10% of companies in the EU automotive and energy-intensive sectors strongly adhere to Industry 5.0 principles. It also found *relatively limited evidence of worker training and sustainability-related practices across companies.*

This gives us an important basis for evaluating the effectiveness of Industry 5.0. The indicators suggest that

the European vision is ambitious but not yet deeply embedded in European industry. At the same time, the indicators themselves remain incomplete. The Commission acknowledges that publicly available data did not adequately capture important elements such as eco-design, human-centric design, organisational innovation and social and environmental innovation.

This is perhaps the central weakness of the current measurement system. Industry 5.0 is concerned with qualities that are difficult to reduce to numbers: human dignity, worker empowerment, trust, creativity, resilience and the quality of cooperation between humans and machines. If these dimensions cannot be measured properly, companies may appear successful according to conventional economic indicators while failing to achieve the deeper objectives of Industry 5.0.

The EU is nevertheless moving in the right direction. In March 2026, the Industry 5.0 Community of Practice presented a prototype Industry 5.0 Learning and Assessment Tool, designed to help organisations assess their performance against the three pillars across different stages of production.

Therefore, the indicators should not be understood simply as statistics. They are becoming a governance instrument: they allow the EU to ask whether its industrial policies are producing the transformation they promise. The real test will be whether these indicators eventually become sufficiently robust to compare companies, sectors and countries and to guide investment and policy decisions.

The overall conclusion is therefore nuanced: the EU has made significant progress in creating a measurement framework, but it has not yet solved the problem of measuring Industry 5.0 comprehensively. The indicators are strongest where traditional quantitative data already exist, particularly for sustainability, investment, skills and technology. They are weaker where Industry 5.0 is most distinctive — namely, human wellbeing, empowerment, organisational transformation and resilience.

In other words, what gets measured gets managed. If Europe succeeds in developing indicators that genuinely capture people, planet and resilience alongside productivity, Industry 5.0 can become more than a vision: it can become a measurable industrial transformation

Ultimately, the success of Industry 5.0 will not be determined by how persuasively Europe describes the future of industry. It will be determined by whether, in practice, European industry becomes more competitive without becoming less human, more productive without becoming more destructive, and more technologically advanced without becoming more vulnerable.

17.Comparison of Industrial Policies

Industrial Policy: Concept, Meaning and Evolution

Industrial policy is a broad and evolving concept that refers to the set of public measures through which a state or supranational authority seeks to influence the structure, development, competitiveness and resilience of productive activity. Unlike sector-specific regulation, industrial policy concerns the wider conditions under which industry develops, including investment, innovation, infrastructure, skills, finance, energy, technology, trade and access to markets and resources. Its central concern is therefore not merely the protection of existing industries, but the creation and preservation of productive capabilities that contribute to long-term economic development.

The term itself is not conceptually fixed. Industrial policy has been used to describe very different approaches, ranging from targeted state intervention and protection of strategic sectors to horizontal policies aimed at improving the general business environment. This ambiguity is important because the meaning of industrial policy has changed substantially over time. What was once associated primarily with state ownership, protectionism and sectoral intervention has progressively evolved towards a broader conception centred on competitiveness, innovation, technological development, sustainability and, more recently, economic resilience and strategic autonomy.

1. Industrial policy as a concept

At its most general level, industrial policy concerns the relationship between the state and the productive structure of the economy. It arises from the recognition that markets do not necessarily produce the industrial structure that a society or economy may require in the long term. Investment decisions are influenced by uncertainty, technological externalities, network effects, information asymmetries, coordination problems and access to finance. In strategic sectors, the social or geopolitical value of maintaining productive capacity may also exceed the private return available to individual firms.

Industrial policy consequently seeks to influence the direction, conditions or capabilities of economic activity. It can operate through financial incentives, taxation, regulation, public procurement, research and development, infrastructure, education and skills,

competition policy, trade instruments, investment screening or partnerships between public authorities and private enterprises.

This makes industrial policy fundamentally different from a simple policy of subsidising industry. Subsidies may be one instrument of industrial policy, but they are not its defining characteristic. A government can pursue industrial policy without directly subsidising firms, for example by establishing common standards, financing research infrastructure, developing transport networks, improving energy security, facilitating access to capital or creating a regulatory environment favourable to technological investment.

Industrial policy can therefore be understood as a strategic framework for shaping productive capabilities.

This broader definition is particularly relevant to the European Union. The EU does not possess the same general economic-policy powers as a sovereign state, nor does it traditionally operate industrial policy through extensive state ownership. Its industrial policy is instead distributed across multiple areas of Union competence, including the internal market, competition, research and innovation, energy, trade, environment, digital policy and external economic relations.

This cross-sectoral character explains why Article 173 TFEU is particularly significant. Rather than establishing an exhaustive industrial-policy competence, Article 173 identifies industrial competitiveness as a Union objective and connects its achievement to policies pursued under other Treaty provisions.

2. The evolution of industrial policy

The concept of industrial policy has undergone several major transformations.

During the period of post-war industrialisation, industrial policy was commonly associated with state-led development. Governments frequently sought to accelerate industrialisation through public ownership, national champions, protection from imports, directed credit and sector-specific support. Heavy industry, steel, energy, transport and manufacturing were often regarded as strategic sectors requiring direct state involvement.

This model was particularly influential in Europe during the decades following the Second World War. Governments considered industrial capacity essential not only for economic development but also for employment, reconstruction and national security. State intervention was therefore widely accepted as a legitimate means of transforming economic structures.

From the 1970s and particularly during the 1980s and 1990s, however, the intellectual and political environment changed. Economic liberalisation, privatisation, deregulation and the increasing importance of competition policy reduced the legitimacy of interventionist industrial strategies. Industrial policy increasingly shifted from “picking winners” towards improving the general conditions in which firms could compete.

This produced what is often described as horizontal industrial policy. Instead of selecting particular companies or sectors for protection, governments focused on measures such as research and development, education, infrastructure, access to finance, competition and entrepreneurship. The underlying assumption was that markets should determine the allocation of resources while governments should correct market failures and provide appropriate framework conditions.

The European Union's industrial-policy framework developed substantially within this paradigm. Article 173 TFEU reflects this approach. It seeks to ensure the conditions necessary for the competitiveness of Union industry while emphasising structural adjustment, entrepreneurship, cooperation, innovation, research and technological development. It also explicitly requires action to be compatible with an open and competitive market.

The concept nevertheless began to change again following the financial crisis of 2008, the disruption of global supply chains, the rise of China as an industrial and technological power, the COVID-19 pandemic, the energy crisis and Russia's invasion of Ukraine. These developments challenged the assumption that efficiency and openness alone were sufficient to guarantee industrial resilience.

Industrial policy consequently entered a new phase.

3. From competitiveness to resilience

The contemporary debate increasingly distinguishes between efficiency and resilience.

Traditional economic policy often prioritised efficiency: firms should obtain inputs from the cheapest and most productive source, regardless of geographical location. Globalisation encouraged extensive international specialisation and just-in-time supply chains.

The experience of recent crises demonstrated that this model can generate vulnerabilities when critical inputs become unavailable or concentrated in a small number of

foreign suppliers.

Industrial policy therefore increasingly asks not only whether Europe can produce goods efficiently, but whether it possesses the capacity to continue producing them under adverse conditions.

This has introduced concepts such as resilience, strategic dependencies, economic security and strategic autonomy into industrial-policy discourse.

Resilience does not necessarily mean producing everything domestically. Rather, it means having sufficient alternatives and capabilities to prevent a disruption in one external relationship from paralysing an essential sector.

This represents an important conceptual shift:

Traditional industrial policy asked how Europe could become more competitive. Contemporary industrial policy increasingly asks how Europe can remain competitive while also remaining resilient to external shocks.

4. From resilience to strategic autonomy

The most recent stage of industrial-policy development is associated with strategic autonomy.

Strategic autonomy emerged particularly strongly in European policy debates concerning technology, defence, energy, critical raw materials and supply chains. It reflects the recognition that economic power and geopolitical power are increasingly interconnected.

Strategic autonomy should not, however, be equated with autarky. For an economy as internationally integrated as the EU, complete economic self-sufficiency would be neither realistic nor desirable.

A more precise understanding is open strategic autonomy: maintaining extensive international economic relationships while ensuring that Europe retains sufficient capacity to act independently where strategic interests are at stake.

This changes the relationship between industrial and external policy. Access to foreign markets, critical resources, technology, investment and infrastructure can no longer be regarded as entirely external to industrial competitiveness. They are increasingly part of the conditions determining whether European industry can remain competitive.

This development provides the conceptual foundation for your proposed reform of Article 173**.**

Comparative Analysis of Industrial Policy: EU, United States, China, Japan, India, Brazil and Russia

The contemporary industrial-policy landscape demonstrates a significant return of the state to the organisation and development of productive capacity. The United States, China, Japan, India, Brazil, Russia and the European Union have all strengthened industrial-policy instruments, although they do so according to substantially different economic models and strategic objectives. The relevant distinction is therefore no longer between countries that have industrial policy and countries that do not. Rather, the central question is what conception of industrial policy each political system has adopted, what instruments it uses, how closely industrial policy is integrated with trade, technology, energy and security policy, and how effectively it can mobilise resources at scale.

For the European Union, this comparison is particularly significant. The EU is confronted by competitors whose industrial strategies increasingly combine economic, technological and geopolitical objectives. The United States links industrial policy to technological leadership and national security; China combines industrial planning with manufacturing scale and technological self-reliance; Japan integrates industrial competitiveness with economic security; India uses targeted incentives to accelerate industrialisation; Brazil is pursuing a mission-oriented reindustrialisation strategy; while Russia has increasingly organised industrial policy around technological sovereignty, import substitution and economic security. The EU has responded through the Competitiveness Compass and Clean Industrial Deal, but its institutional structure remains fundamentally different because industrial-policy instruments are divided between the Union and its Member States. (EUR-Lex)

Comparative matrix

Parameter	EU	US	China	Japan	India	Brazil	Russia
Basic model	Open-market strategic	Market-led strategic intervention	State-directed developmental industrial policy	Coordinated developmental/economic-	Developmental and production-oriented	Mission-oriented developmental	State-directed sovereignty /import-

	industrial policy			security model		industrial policy	substitution model
Principal objective	Competitiveness, resilience, decarbonisation and strategic capacity	Technology leadership, manufacturing and national security	Manufacturing dominance, technological leadership and self-reliance	Economic security, technology and high-value manufacturing	Industrialisation, employment, self-reliance and export capacity	Reindustrialisation, productivity and sustainable development	Technological sovereignty, import substitution and economic security
Role of state	Increasing but constrained by EU competences and competition rules	Increasingly interventionist	Very high	High but coordinated with private sector	High and targeted	High and developmental	Very high
Market orientation	Very high	High, but increasingly protectionist	Managed market	High	Mixed	Mixed	Relatively low in strategic sectors
Strategic sectors	Clean technology, digital, semiconductors, defence, critical raw materials, batteries, biotech	Semiconductors, AI, defence, energy, critical minerals, advanced manufacturing	EVs, batteries, solar, semiconductors, AI, robotics, aerospace	Semiconductors, batteries, robotics, automotive, AI, advanced materials	Electronics, semiconductors, pharmaceuticals, automotive, defence, renewables	Energy, agroindustry, health, bioeconomy, infrastructure, digital	Defence, energy, nuclear, aerospace, agriculture, machinery, software
Finance	EU funds + national budgets + private finance	Large federal incentives + deep private capital markets	State banks + public investment + industrial funds	Public-private finance	Production-linked incentives + public finance	BNDES/FINEP + public financing	State banks + directed finance
Trade orientation	Open and rules-based, increasingly strategic.	Increasingly reciprocal/protectionist	Export-oriented and strategically managed	Open but security-conscious	Selective openness and export promotion	Export diversification	Increasingly redirected toward non-Western markets
Supply-chain policy	Diversification/de-risking	Reshoring/friend-shoring	Self-reliance + global integration	Resilience + trusted partnerships	Localisation + diversification	Local value addition	Import substitution
Technology strategy	Strong R&D, weaker scale-up.	Frontier technology + commercial scale	Massive state-supported scale	Strong applied technology	Rapid technological upgrading	Developing capabilities	Technological independence in selected strategic areas

Energy strategy	Decarbonisation + energy security.	Domestic energy advantage + transition	Manufacturing-led energy transition	GX/decarbonisation	Development + transition	Renewable/bio energy potential	Energy/resource security
External dimension	Increasingly integrated.	Strongly integrated with security	Strongly geopolitical	Increasingly economic-security based	Increasingly strategic	Trade/development oriented	Highly geopolitical
Main strength	Single Market, regulation, R&D, diversified industry.	Capital, technology, energy and scale	Manufacturing ecosystem and scale	Technology and manufacturing quality	Scale, labour, market and growth	Resources, energy and agricultural base	Resources, energy and strategic industries
Main weakness	Fragmentation, energy costs, financing and scale-up.	Policy volatility and protectionism	Overcapacity and state inefficiency	Demography and resource dependence.	Infrastructure/ productivity constraints.	Deindustrialisation and productivity	Sanctions, isolation and technological constraints

Russia: a distinct model of industrial policy

Russia deserves particular attention because it demonstrates the most explicit transformation of industrial policy into an instrument of technological sovereignty and economic security.

Russian industrial policy has historically contained elements of state support, strategic-sector development and import substitution. Following the deterioration of relations with Western economies and the imposition of extensive sanctions, however, these objectives have become considerably more central.

Russian government policy explicitly identifies technological sovereignty, import substitution and economic security as core industrial objectives. In 2025, the Russian government described the integration of industrial and technological capacities as a means of strengthening economic security, import substitution and technological sovereignty. (Government of Russia)

This has also been formalised through a broader technological-policy framework. Russian policy defines technological leadership in terms of technological independence, domestic development of critical and cross-cutting technologies, national control over those technologies and the production of goods that can substitute for products based on foreign technologies. (Government of Russia)

The Russian model can therefore be characterised as:

industrial policy → import substitution → technological sovereignty → economic security.

This is significantly different from the EU's traditional conception of industrial policy. The EU historically treated international openness and competition as important elements of industrial competitiveness. Russia increasingly treats external dependency itself as a potential strategic vulnerability.

The Russian approach nevertheless has important limitations. Its emphasis on import substitution can protect domestic production but may also reduce competitive pressure and generate inefficient duplication. More importantly, restrictions on access to foreign technology, capital and markets can constrain technological upgrading. The Russian model demonstrates that industrial sovereignty can be strengthened in some dimensions while overall technological efficiency and international competitiveness may deteriorate in others.

This is precisely why Russia is an important comparator for the EU: it illustrates both the attraction and the risks of moving from competitiveness towards sovereignty.

Russia compared with China

Russia and China share an emphasis on technological sovereignty, state coordination and strategic industries, but their economic positions are fundamentally different.

China possesses enormous manufacturing scale, a huge domestic market, extensive industrial ecosystems and deep integration into global supply chains. It can therefore

pursue technological self-reliance while simultaneously remaining a major global exporter.

Russia possesses major natural-resource, energy, defence, nuclear and aerospace capabilities but has a substantially smaller manufacturing ecosystem and faces much greater restrictions on access to Western technologies and capital.

China therefore pursues strategic autonomy from a position of manufacturing scale, whereas Russia increasingly pursues strategic autonomy as a response to external constraints.

This distinction is highly relevant to the EU. The Chinese model demonstrates how strategic industrial policy can be used to acquire global industrial scale. The Russian model demonstrates the potential costs when strategic autonomy becomes increasingly associated with economic isolation.

Russia compared with the EU

The EU and Russia represent almost opposite institutional approaches to strategic autonomy.

The Russian model places technological independence and domestic control at the centre of industrial strategy. The EU, by contrast, increasingly pursues strategic autonomy while maintaining international economic openness.

The EU's current Competitiveness Compass explicitly combines innovation, decarbonisation and security, while the Clean Industrial Deal seeks to address energy costs, clean manufacturing, supply chains and dependence on third-country resources. (EUR-Lex)

This distinction can be formulated as:

Russia: sovereignty through reduced external dependence.

EU: strategic autonomy through diversified interdependence.

The second approach is much more compatible with Europe's economic structure. Given the depth of European participation in international trade and global value chains, complete technological or resource autarky would be neither economically feasible nor desirable.

The objective should instead be to ensure that no external dependency becomes sufficiently concentrated to threaten Europe's ability to act.

Comparative evaluation: what the seven models reveal

The comparison produces five important conclusions.

First, industrial policy has returned as a central instrument of economic strategy

The seven cases demonstrate that industrial policy is no longer confined to traditional developmental states. Even the United States and the EU, historically more reluctant to engage in explicit industrial intervention, increasingly use targeted measures to develop strategic capabilities.

The difference is therefore increasingly one of degree and institutional form rather than existence.

Second, the boundary between industrial and security policy is disappearing

China, the United States, Japan and Russia explicitly connect technological capacity with national or economic security. The EU is moving in the same direction through its focus on strategic dependencies, supply-chain resilience, defence, critical technologies and economic security. The Council's description of the current EU industrial strategy explicitly identifies strategic dependencies, Single Market resilience and the green and digital transitions as central objectives. (Consilium)

This is one of the strongest arguments for reconsidering Article 173.

Third, scale matters

China and the United States demonstrate that industrial policy becomes significantly more effective when it can mobilise enormous financial, technological and market resources.

This is a structural problem for Europe.

The EU has continental scale economically but does not always possess equivalent institutional scale in industrial policymaking.

A French, German or Italian industrial policy cannot independently reproduce the scale of American or Chinese strategic investment. European industrial policy therefore needs to transform the Single Market's economic scale into strategic policy scale.

Fourth, openness and strategic autonomy are not necessarily contradictory

Japan provides a particularly useful example of how economic security can coexist with international openness. The EU should draw the same lesson.

Russia demonstrates the risks of interpreting sovereignty as self-sufficiency. China demonstrates that strategic autonomy can coexist with extensive global integration, but its model relies on a scale of manufacturing capacity that Europe cannot easily reproduce.

For Europe, the appropriate objective is therefore:

open strategic autonomy rather than autarky.

Fifth, industrial ecosystems matter more than individual firms

The successful strategies increasingly focus on entire value chains: research, finance, infrastructure, production, skills, procurement, standards and international markets.

This is especially important for Europe because its industrial capabilities are geographically distributed across Member States. The EU's strategic challenge is therefore to transform nationally dispersed capabilities into integrated European industrial ecosystems.

Performance metrics

For an academic comparison of the **EU, United States, China, Japan, India, Brazil and Russia**, I would evaluate industrial power using five core metrics:

Dimension	**Indicator**
Productive Capacity	Manufacturing value added (% and absolute output)
Technological Capacity	R&D expenditure (% GDP and absolute spending)
Competitiveness	High-tech manufacturing and exports
Resilience	Supply-chain diversification and domestic value-added share
Global Influence	Position in global value chains and trade networks

Productive Capacity

China is the world's largest manufacturing economy and dominates global manufacturing value added. The United States remains second in overall industrial output, while the EU collectively remains one of the world's largest industrial regions. Japan retains a highly advanced manufacturing base despite slower growth. India is expanding rapidly but remains below China, the EU and the United States in manufacturing sophistication. Brazil remains largely commodity-oriented, while Russia's industrial structure remains heavily dependent on energy and resource sectors.

Approximate manufacturing strength ranking:

China → EU → United States → Japan → India → Russia → Brazil.

Technological Capacity

The United States remains the global leader in innovation-intensive sectors, research spending and frontier technologies. China has rapidly closed the gap through large-scale public and private investment. The EU possesses strong scientific capabilities but often struggles to commercialise innovation at the same scale as the US and China. Japan remains highly innovative, while India is emerging as a major technology and digital-services hub. Brazil and Russia lag significantly behind the leading technological powers. (OECD)

Approximate technological ranking:

United States → China → EU → Japan → India → Russia → Brazil. (OECD)

Global Value Chains and Trade Integration

The EU remains one of the most deeply integrated participants in global value chains and international trade. China occupies a central position in manufacturing supply chains and increasingly controls strategic stages of production. The United States maintains global influence through technology, finance and high-value-added sectors.

Japan remains highly integrated in advanced manufacturing networks. India is increasingly integrated but still less embedded than China or the EU. Brazil and Russia remain more dependent on commodity exports than on advanced manufacturing value chains. (OECD)

Supply-Chain Resilience

China possesses significant domestic industrial depth and a large internal market, making it relatively resilient. The United States has strong technological capabilities but remains dependent on global supply chains for some strategic inputs. The EU is highly diversified but exposed to external dependencies in energy, semiconductors and critical raw materials. Japan has developed extensive diversification strategies since earlier supply-chain disruptions. India benefits from domestic scale but faces infrastructure constraints. Brazil possesses substantial natural-resource advantages. Russia's resilience is constrained by sanctions and limited technological access. (OECD)

Overall Industrial Power Assessment

Rank	**Economy**	**Assessment**
1	China	Manufacturing superpower with increasing technological capabilities
2	United States	Technological superpower with strong industrial base
3	European Union	Highly competitive industrial bloc with strong innovation but fragmented governance
4	Japan	Advanced technological manufacturing power
5	India	Rapidly rising industrial power with large growth potential
6	Russia	Resource and defence-industrial power but technologically constrained
7	Brazil	Major industrial economy in Latin America but less technologically advanced

Relevance to Out EU Industrial Policy Argument

The comparison highlights the central challenge facing the EU. Unlike China, the EU lacks a unified industrial state. Unlike the United States, it lacks a fully integrated fiscal and industrial-policy framework. Yet it remains one of the world's largest industrial and trading powers. The emerging focus of EU industrial policy is therefore not simply to increase manufacturing output but to strengthen Europe's position across five dimensions:

productive capacity, technological capability, resilience, competitiveness and strategic partnerships.

This is precisely why concepts such as **economic security**, **strategic autonomy**, **critical raw materials**, **industrial ecosystems**, and **managed strategic interdependence** have become central to contemporary EU industrial policy. The objective is not to emulate China or the United States directly, but to develop a distinct European model capable of combining market openness with strategic industrial capacity and diversified external partnerships.)

Strategic implications for the EU

The comparison suggests that the EU should adopt neither the Chinese model of comprehensive state direction nor the Russian model of import-substitution sovereignty. It should also avoid simply reproducing the increasingly protectionist aspects of US policy.

The appropriate European model is strategic, selective and open industrial policy.

The first strategic implication is that Europe should move from horizontal competitiveness policy towards capability-based industrial policy. The objective should be to identify the capabilities that are indispensable to Europe's long-term economic and technological position: advanced semiconductors, AI, quantum technologies, energy systems, critical raw materials, defence technologies, biotechnology, advanced manufacturing, telecommunications and strategic infrastructure.

The second implication is that industrial policy should be integrated with trade and external economic policy. The EU's industrial strategy cannot be successful if European companies can innovate domestically but remain dependent on external suppliers for the resources, technologies or markets necessary to commercialise that innovation.

The third implication is that the EU needs a stronger European financing architecture. The comparison with the United States and China shows the importance of scale. European savings, investment instruments, development banks and capital markets need to be better connected to strategic industrial priorities.

The fourth implication is that the EU should use public procurement and European demand strategically. The EU's enormous public market can provide an initial demand base for European technologies and help firms achieve the scale required to compete internationally. The Clean Industrial Deal is already moving in this direction, including measures intended to increase demand for European-made clean products.

The fifth implication concerns energy. Industrial competitiveness cannot be separated from energy competitiveness. The EU's current industrial strategy already recognises affordable energy as a central condition for competitiveness, particularly for energy-intensive sectors.

Strategic implications for Member States

The comparison also suggests that Member States should not attempt to construct independent national versions of Chinese or American industrial policy.

The appropriate model is European coordination with national specialisation.

Member States should retain responsibility for industrial ecosystems where they possess genuine comparative advantages, including skills, infrastructure, clusters and research capabilities. However, these capabilities should increasingly be integrated into European value chains.

A semiconductor facility in one Member State, specialised machinery in another, research capacity in a third and logistics infrastructure in a fourth should be treated as components of one European industrial ecosystem, rather than as competing national projects.

This also means that the EU should limit subsidy competition between Member States. If national industrial policy becomes primarily a competition for fiscal support, the result could be the fragmentation of the Single Market and the concentration of industrial investment in the fiscally strongest states.

The strategic division of labour should therefore be:

EU level: strategic priorities, common rules, trade, external partnerships, major financing instruments, competition framework, cross-border infrastructure and European-scale projects.

Member-State level: industrial clusters, education and skills, local infrastructure, implementation, national investment incentives and regional industrial development.

Implications for the new Article 173 TFEU

The comparison with Russia makes the constitutional argument for your proposed reform even stronger.

The Treaty should recognise the contemporary relationship between competitiveness, resilience and strategic capacity, but it should simultaneously distinguish the European model from technological autarky.

A new Article 173 could therefore establish that Union industrial policy aims not only at competitiveness but also at:

technological capacity; resilience of strategic supply chains; secure access to critical resources and energy; development of strategic industrial capabilities; and the ability of European industry to compete internationally within an open global economy.

Most importantly, the provision should recognise that these objectives may require action through internal and external Union policies.

The logic could be expressed as:

The US demonstrates the importance of capital and technological scale. China demonstrates the importance of industrial ecosystems and state coordination. Japan demonstrates the compatibility of economic security with openness. India demonstrates the potential of targeted industrial incentives to accelerate structural transformation. Brazil demonstrates the role of mission-oriented industrial policy. Russia demonstrates both the strategic importance of technological sovereignty and the risks of excessive dependence on import substitution and economic isolation. The EU should learn from all six without reproducing any of them.

The resulting European model would be open strategic industrial policy: an industrial strategy that preserves competition and international economic integration while ensuring that Europe possesses the productive, technological, financial and infrastructural capabilities necessary to withstand external shocks and compete globally.

That concept provides a particularly strong normative foundation for your proposed new Article 173: not industrial protectionism, not autarky, but European strategic capacity within an open economy.

Analytical Conclusions

The comparison of the European Union, the United States, China, Japan, India, Brazil and Russia confirm a fundamental transformation in the meaning of industrial policy. It is no longer merely an instrument for protecting or promoting particular industries. It has become a broader strategy for shaping productive capacity, technological capability, resilience and economic power.

Across the major powers, the old distinction between market economies and interventionist economies is increasingly losing its explanatory value. The United States combines private capital and technological entrepreneurship with substantial state intervention in semiconductors, advanced manufacturing and strategic technologies. China combines state coordination, industrial finance and manufacturing scale with technological self-reliance. Japan links industrial competitiveness to economic security while preserving an open economy. India uses targeted incentives to accelerate manufacturing and technological upgrading. Brazil pursues mission-oriented reindustrialisation. Russia has increasingly placed industrial policy within a framework of technological sovereignty and import substitution. The European Union, meanwhile, is moving from a predominantly horizontal conception of competitiveness towards a more strategic industrial policy.

The common lesson is unmistakable: industrial policy has returned, but in a new form. Its purpose is increasingly not to preserve yesterday's industries, but to create tomorrow's capabilities.

The same evidence demonstrates that competitiveness can no longer be separated from resilience. The pandemic, energy crisis, geopolitical tensions and supply-chain disruptions have exposed the vulnerability of an industrial model based exclusively on efficiency and lowest-cost sourcing. The major powers are consequently seeking greater control, diversification or redundancy in critical supply chains. Competitiveness now means not only producing efficiently, but possessing the capacity to withstand disruption and adapt to structural change.

Technology has become the central field of this competition. Semiconductors, artificial intelligence, quantum technologies, advanced materials, robotics, biotechnology, batteries and telecommunications are no longer simply commercial sectors. They are foundations of future economic power. For Europe, the problem is therefore not simply a shortage of scientific excellence. It is the persistent difficulty of converting research into investment, production, scale and global commercial leadership. The European challenge is the innovation-to-industrialisation gap.

The comparison also reveals the growing convergence of industrial and security policy. Productive capacity has become a source of strategic power, while technological dependence can become a source of vulnerability. The relationship can therefore be expressed as:

industrial capacity creates technological capability; technological capability creates economic security; economic security creates strategic autonomy.

This transformation has profound implications for Europe. The Union possesses enormous economic and technological assets, but its capacity to mobilise them remains fragmented. Europe has the scale of a great industrial power without always possessing the institutional means to act with the scale, speed and unity of one.

The answer cannot be to reproduce the Chinese model of state direction, the Russian model of import substitution or the increasingly protectionist elements of American policy. Nor can Europe return to an exclusively horizontal model in which markets alone determine the future industrial structure.

Europe requires its own model: open strategic industrial policy.

Its purpose should be to preserve competition and international openness while developing the capabilities that Europe cannot afford to lose. Strategic technologies, energy, critical raw materials, infrastructure, finance, advanced manufacturing and resilient supply chains should therefore be treated not as isolated policy areas, but as components of a single European industrial strategy.

This also requires a clearer division of responsibility between the Union and its Member States. National governments should continue to develop skills, infrastructure, industrial clusters and regional capabilities. But those capabilities must increasingly be connected through European value chains. A research centre in one Member State, a manufacturing facility in another, specialised machinery elsewhere and European financing should be understood as parts of one European industrial ecosystem, not as competing national projects.

The comparison with Russia is particularly instructive. Strategic autonomy cannot mean autarky. A Europe that attempted to eliminate all external dependencies would sacrifice many of the advantages derived from international trade and technological cooperation. The objective must instead be strategic autonomy through diversified interdependence: reducing dependencies that create unacceptable vulnerabilities while preserving the openness that makes Europe prosperous and innovative.

This conclusion leads directly to Article 173 TFEU. The contemporary meaning of industrial competitiveness can no longer be confined to conditions inside the Single Market. Competitiveness depends increasingly upon access to foreign markets, critical resources, energy, technologies, capital, infrastructure and international supply chains. What was once considered external to industrial policy has become part of the very conditions under which European industry can compete.

The Treaty should therefore evolve accordingly. A modernised Article 173 should place competitiveness, resilience, strategic capacity and international openness within a coherent constitutional framework. It should recognise that industrial objectives may require coordinated action through trade, energy, research, investment, infrastructure and external economic relations, while preserving competition and the openness of the European economy.

The great powers are already acting on this new reality. The question for Europe is not whether industrial policy has returned. It has. The question is whether Europe will shape its own industrial future or allow that future to be shaped by the industrial strategies of others.

The strategic choice is therefore not between the market and the state, nor between openness and protection. It is between dependence without strategy and openness with capacity. Europe must remain open to the world, but it must possess the strength to act within it.

18.Stakeholder-based Co-thinking on the EU's Industrial Policy

The stakeholders in the EU's Industry 5.0 agenda are broader than the traditional industrial-policy community because Industry 5.0 explicitly connects competitiveness, human-centred work, resilience and sustainability.

Table

Stakeholder	**Main role in Industry 5.0**
European Commission	Sets the policy framework, regulation, funding and industrial strategy
DG GROW	Industrial competitiveness, SMEs, manufacturing ecosystems and Single Market policy
DG RTD	Research, technology development, Horizon Europe and industrial R&I
DG CONNECT	AI, data, digitalisation, robotics, cloud, digital twins and advanced technologies
DG EMPL	Skills, labour-market transition, quality jobs and social dimension
DG CLIMA / ENV	Decarbonisation, circular economy, resource efficiency and environmental objectives
DG ENER	Industrial energy transition, electrification and energy resilience
EIB / EIF	Financing industrial transformation and scaling innovative companies
Member-state governments	National industrial, innovation, skills, energy and investment policies
Regional & local authorities	Industrial clusters, infrastructure, skills ecosystems and place-based implementation
Industry	Manufacturing companies, large industrial groups and industrial SMEs implementing Industry 5.0
Technology providers	AI, robotics, automation, IoT, digital twins, advanced materials, biotechnology and cybersecurity

Start-ups / scale-ups	Commercialisation of new Industry 5.0 technologies and business models
Universities & research organisations	Research, technology development, experimentation and knowledge transfer
European Technology Platforms / clusters	Coordination of sectoral research and industrial ecosystems
Workers & trade unions	Human-centred production, job quality, participation, occupational safety and skills
Employers' organisations	Industrial competitiveness, workforce adaptation and regulatory dialogue
Education & vocational-training systems	Reskilling, upskilling and lifelong learning
Civil society / consumers	Ethical, social, environmental and societal expectations
Standards organisations	Interoperability, safety, AI, robotics, data and sustainability standards
Financial sector / venture capital	Capital for technology adoption and industrial scaling
International partners	Technology, supply-chain, standards and industrial cooperation

The strategic architecture

I would organise the EU Industry 5.0 stakeholder system into six concentric layers:

EU institutions → Member States → regions and industrial ecosystems → firms and technology providers → workers and knowledge institutions → society and international partners.

The crucial difference from Industry 4.0 is that the worker is no longer simply an input into technological transformation. Industry 5.0 places the interaction between human capabilities + machines + AI + sustainability + resilience at the centre.

This means that the EU should treat Industry 5.0 not merely as a technology programme, but as a multi-stakeholder industrial transformation policy involving industrial policy, research, labour, education, climate, energy, finance and regional development.

A particularly important stakeholder is therefore the European industrial ecosystem itself—clusters bringing together manufacturers, SMEs, universities, vocational institutions, technology companies, investors and public authorities. This is where Industry 5.0 can move from EU strategy into actual production systems.

A useful way to simulate collective European co-thinking on the evolution of Industry 5.0 is not to begin with a predefined policy framework, but with a conversation. In this imagined European stakeholder council, no participant arrives carrying the finished answer. Each actor enters with a different concern, a different conception of progress, and a different understanding of what industry ought to achieve. Industry 5.0 emerges not as a technical blueprint but as the outcome of a sustained dialogue between economic efficiency, technological possibility, social legitimacy and strategic necessity.

What gradually becomes apparent is that the future of European industry cannot be determined by engineers alone, nor by economists, governments, firms or citizens acting in isolation. It is forged through a process of mutual challenge in which every stakeholder both advances and contests the assumptions of the others. The resulting vision is therefore neither purely technological nor purely social. It is an attempt to reconcile prosperity, resilience and human flourishing within a single industrial paradigm.

The conversation begins with the European Commission.

The Commission asks:

How can Europe remain competitive in an era of technological disruption, geopolitical uncertainty and

ecological transition?

Yet even as the question is posed, it becomes clear that competitiveness can no longer be understood in its traditional sense. Industrial success can no longer be measured solely through output, exports or productivity growth. The disruptions of recent years have demonstrated that efficiency without resilience can become fragility, and growth without sustainability can undermine its own foundations. Competitiveness, resilience and sustainability are increasingly recognised not as separate objectives but as mutually reinforcing dimensions of industrial strength. From this recognition emerges the first principle of Industry 5.0: strategic autonomy through transformation.

Industry enters the discussion next.

Business leaders ask:

How can firms adopt artificial intelligence, robotics and advanced automation without sacrificing competitiveness in global markets?

Their concern is practical. Technology must generate measurable returns. Innovation cannot be pursued as an end in itself. New technologies must increase productivity, support investment and strengthen Europe's industrial position.

Yet the discussion immediately broadens. Researchers observe that the challenge is no longer simply the automation of existing processes. The frontier of innovation lies in the convergence of artificial intelligence, robotics, advanced materials, biotechnology and digital systems. The question is not how machines can replace people, but how human and machine capabilities can be combined to create forms of production that were previously impossible.

Technology companies therefore introduce a different vision:

The future is not autonomous technology operating independently of people, but collaborative systems in which human intelligence and machine intelligence augment one another.

From this perspective emerge concepts such as collaborative robots, digital twins, adaptive manufacturing systems and trustworthy artificial intelligence. Technology ceases to be a substitute for human capability and becomes a partner in its extension. The emerging value is no longer automation but human–technology symbiosis.

At this point, workers and trade unions intervene.

They ask:

What becomes of work, skills, autonomy and dignity in this new industrial model?

Their challenge is fundamental. A human-centred industrial system cannot simply mean designing more efficient ways for workers to serve automated processes. Human beings cannot become residual components in increasingly autonomous systems.

The debate therefore shifts from productivity alone toward questions of agency and participation. Worker involvement in technological design, lifelong learning, continuous reskilling and meaningful human oversight become central features of the discussion. Productivity is redefined. It is no longer solely about producing more with fewer inputs. It is also about creating workplaces that enhance human capabilities, creativity and wellbeing.

The concept of human dignity enters the centre of the industry 5.0 narrative.

Regional authorities then introduce another dimension.

They ask:

Where will this transformation occur?

Industrial change, they note, is rarely distributed evenly. Innovation tends to concentrate in already prosperous regions, while peripheral regions struggle to attract investment, talent and technological capabilities. If Industry 5.0 merely reinforces existing territorial inequalities, it risks undermining the social cohesion upon which the European project depends.

The discussion therefore turns toward regional ecosystems, industrial transition zones, innovation clusters and place-based strategies capable of diffusing technological opportunities across Europe. Territorial cohesion becomes not an afterthought but a condition of successful transformation.

Educational institutions raise a related concern.

Can Europe's systems of education and training keep pace with the accelerating rate of technological change?

Traditional qualifications increasingly risk becoming obsolete before careers have ended. Learning can no longer be concentrated at the beginning of working life. Instead, continuous reskilling, lifelong learning and adaptive education systems become necessary features of a dynamic industrial economy.

Adaptability itself emerges as a strategic capability.

Investors and financial institutions subsequently ask a different question:

How can Industry 5.0 become investable?

Vision alone cannot transform industry. Capital must be mobilised at scale. Yet investors caution that sustainability without productivity may struggle to attract sufficient financing. Industrial transformation must therefore generate long-term value creation rather than rely indefinitely on public support.

This introduces an important discipline into the conversation. Ambition must be translated into bankable projects, credible business models and measurable economic outcomes. Industry 5.0 must become not merely desirable but economically viable.

At this stage environmental organisations intervene.

They ask a deceptively simple question:

What is the purpose of greater productivity?

The question challenges one of the deepest assumptions of industrial development. If increased productivity merely accelerates resource consumption, environmental degradation and ecological instability, can it truly be considered progress?

The dialogue consequently broadens beyond efficiency toward circularity, regeneration and resource stewardship. Production systems are increasingly evaluated not only by what they produce, but by how they interact with ecological systems. The emerging value is planetary responsibility.

Citizens then bring the conversation to its most fundamental level.

They ask:

What do people actually gain from all of this?

The question exposes a recurring tendency in industrial policy to focus on technologies rather than outcomes. Citizens are less concerned with artificial intelligence, robotics or digital twins than with the quality of life these technologies make possible.

They respond:

Industry should not exist to serve technology. Technology should exist to serve society.

From this perspective, the purpose of industrial transformation is not simply greater output. It is the creation of products and services that are safer, more sustainable, more personalised, more durable and more responsive to human needs. Economic growth becomes a means rather than an end.

Finally, Member States and international partners introduce the geopolitical dimension.

Member States ask:

How can Europe coordinate transformation without undermining the diversity of its economic models and industrial structures?

International partners ask:

How can Europe pursue strategic autonomy without retreating into isolation?

These interventions clarify that strategic autonomy cannot mean self-sufficiency. Europe's prosperity depends upon openness, trade and participation in global value chains. The challenge is not to eliminate interdependence but to ensure that interdependence remains resilient, diversified and compatible with European interests and values.

The conversation thus arrives at a profound reformulation of its original question.

It began with:

How do we make European industry more technologically advanced?

Industry replied:

Technology must improve productivity.

Workers replied:

Productivity must improve people's working lives, not merely reduce labour costs.

Regions replied:

The benefits of transformation must be shared across Europe.

Environmental actors replied:

Productivity must operate within ecological limits.

Researchers replied:

The future lies not in automation alone, but in the convergence of human, digital, biological and physical systems.

Citizens replied:

Industry must ultimately serve society rather than technology.

And gradually the question evolves into something much larger:

How can Europe create an industrial system that simultaneously advances prosperity, strengthens resilience, preserves human dignity, respects planetary boundaries and enhances the long-term wellbeing of its citizens?

Industry 5.0 emerges from this dialogue not as a technological upgrade to Industry 4.0, but as a normative and strategic reorientation of industrial development itself. Its defining characteristic is not simply smarter factories or more advanced automation. It is the recognition that industrial progress must be judged by the extent to which it creates economic value, social value and strategic value simultaneously. In that sense, Industry 5.0 represents less a new technological revolution than a new understanding of what industrial transformation is ultimately for.

Citizens therefore offer the final and perhaps most important intervention in the dialogue. They shift attention away from technology itself and toward the purposes that technology is meant to serve.

They ask:

What is the ultimate purpose of industrial transformation?

Their answer reframes the entire discussion:

Industry must ultimately generate greater societal wellbeing.

Not wellbeing understood narrowly as higher consumption or income alone, but as a broader condition encompassing economic security, meaningful work, social cohesion, environmental quality, health, opportunity, participation and human flourishing. In this perspective, productivity is not an end in itself; it is valuable because it expands society's capacity to create lives that are more prosperous, resilient and fulfilling.

The European Commission then synthesises the diverse perspectives emerging from the dialogue into a new proposition:

Industry 5.0 should evolve from a technology paradigm into a European societal–industrial paradigm: an economy in which human intelligence and machine intelligence cooperate to generate prosperity, resilience and innovation within social and planetary boundaries.

This marks a profound conceptual shift. Industry 5.0 is no longer simply a framework for organising production. It becomes a framework for organising the relationship between technology, society and economic development. The question is no longer how technology can transform industry, but how industry can contribute to the long-term flourishing of European society.

The emerging vision

At its most concise, the evolving concept can be expressed as:

Industry 5.0 = Human Capability × Machine Intelligence × Planetary Stewardship × Resilience

Its historical evolution can be understood as a progressive widening of industrial purpose:

Industry 3.0→ automation of production

Industry 4.0→ connectivity, data and intelligent production systems

Industry 5.0→ human–machine collaboration and human-centred innovation

Industry 5.0+→ adaptive, regenerative and societal industrial ecosystems

The significance of this evolution lies not merely in technological sophistication but in a changing understanding of what industry is for. The defining transition is from smart factories to smart industrial societies; from optimising production systems to enhancing the resilience and wellbeing of entire socio-economic systems.

Industry is thus reimagined not as an isolated economic sector but as a foundational institution through which societies create prosperity, shape technological trajectories, distribute opportunity and respond to collective challenges.

The strategic tensions at the heart of Industry 5.0

The co-thinking exercise reveals that Industry 5.0 is not defined by consensus alone. It emerges through a series of

enduring tensions that cannot be permanently resolved but must be continuously managed.

Productivity and employment

Artificial intelligence, robotics and advanced automation promise significant gains in productivity. Yet the central challenge is not simply how to produce more with fewer resources, but how to ensure that technological progress expands human opportunity rather than diminishes it.

The question is therefore:

How can technological progress create better work rather than merely reduce labour requirements?

The objective is not job preservation at any cost, nor automation at any cost, but the creation of forms of work that are more skilled, creative, meaningful and resilient.

Automation and human agency

As intelligent systems become increasingly capable of autonomous decision-making, societies must determine where authority should remain human.

The issue is not whether machines can decide, but:

Which decisions should remain subject to human judgment, accountability and ethical responsibility?

Industry 5.0 consequently places human agency at the centre of technological governance.

Efficiency and resilience

For decades, industrial systems prioritised efficiency through optimisation, concentration and just-in-time production. Recent crises have exposed the vulnerabilities created by such models.

The challenge becomes:

How much efficiency should be sacrificed to secure resilience?

Strategic redundancy, diversified supply chains and domestic capabilities may appear inefficient in the short term yet create significant value by reducing systemic risk.

Growth and planetary boundaries

Industrial development has historically been associated with rising material throughput and environmental pressure. Industry 5.0 confronts the question of whether prosperity can be decoupled from ecological degradation.

The challenge is no longer simply sustainable production but:

Can industrial systems become regenerative rather than merely less harmful?

This shifts attention toward circularity, resource stewardship, low-carbon production and long-term ecological resilience.

Scale and diversity

Europe benefits from large integrated markets while also deriving strength from regional specialisation, industrial districts and SME ecosystems.

The challenge is:

How can Europe achieve scale without sacrificing diversity?

A resilient industrial system requires both globally competitive champions and vibrant local ecosystems capable of experimentation and adaptation.

Technology leadership and technological dependence

The accelerating strategic importance of artificial intelligence, semiconductors, cloud infrastructure, quantum technologies and advanced manufacturing has transformed technological capability into a geopolitical issue.

The question becomes:

How can Europe remain technologically open while avoiding critical dependencies that undermine its capacity for autonomous action?

Innovation and regulation

Europe's regulatory traditions are often viewed as constraints on innovation. Yet trust, legitimacy and social acceptance are themselves conditions for technological progress.

The challenge is therefore not regulation versus innovation, but:

How can governance enable responsible experimentation while safeguarding fundamental rights and public trust?

Globalisation and strategic autonomy

Industry 5.0 rejects both economic isolation and unqualified dependence.

The challenge is:

How can Europe remain deeply integrated within global networks while retaining control over capabilities that are essential to its prosperity, security and democratic autonomy?

Strategic autonomy thus becomes compatible with openness rather than opposed to it.

The emerging mission

Taken together, these reflections suggest a broader mission for Industry 5.0:

To transform European industry into the world's most human-centred, sustainable, resilient and technologically advanced industrial ecosystem, where people and intelligent technologies cooperate to create shared prosperity, societal wellbeing and long-term strategic capability.

This mission extends beyond industrial competitiveness. It positions industry as a vehicle for advancing economic performance, social progress and ecological stewardship simultaneously.

Five operational pillars

Humanity

Technology should augment human capabilities rather than replace human purpose. Industrial systems must preserve dignity, autonomy, creativity and meaningful participation.

Prosperity

Industry 5.0 should generate productivity growth, investment, innovation, quality employment and globally competitive European enterprises capable of sustaining long-term economic prosperity.

Resilience

European industrial systems should be capable of absorbing and adapting to geopolitical, technological, climatic, financial and supply-chain disruptions without systemic breakdown.

Regeneration

Industrial activity should progressively contribute to the restoration of natural systems through circularity, resource efficiency, decarbonisation and responsible stewardship of environmental assets.

Intelligence

Europe should combine human intelligence with artificial intelligence, robotics, biotechnology, advanced materials, data infrastructures and emerging technologies to expand its productive and innovative capacities.

The deeper European values

Beneath these pillars lies a distinctive normative foundation. Industry 5.0 ultimately expresses a particular vision of Europe's future and of the relationship between technology and society.

Its value system can be articulated through a constellation of interconnected principles:

- Human dignity
- Freedom and agency
- Innovation
- Competitiveness
- Solidarity
- Sustainability
- Resilience
- Inclusiveness
- Trust
- Technological sovereignty
- Openness
- Intergenerational responsibility

Together these values distinguish the European approach from models that prioritise technological acceleration alone or economic efficiency alone.

The distinctive European proposition is therefore not:

Europe versus technology.

Nor is it:

Technology as an end in itself.

Rather, it is the conviction that:

Europe can become the place where technological power is reconciled with human dignity, economic prosperity,

democratic legitimacy and ecological responsibility; where innovation strengthens rather than diminishes human agency; and where industrial progress is ultimately judged by its contribution to the flourishing of present and future generations.

Viewed in this way, Industry 5.0 becomes far more than a successor to Industry 4.0. It evolves into a civilisational project: a European effort to redefine the relationship between industrial power, technological capability, human freedom and planetary stewardship in the twenty-first century.

Table



The infographic presents Industry 5.0 not as a programme to be imposed from above, but as a European undertaking to be forged through common purpose. Its central argument is simple: the future of European industry cannot be decided by governments alone, nor by industry, workers, researchers, investors or civil society acting separately. It must be built through their combined judgement. The eleven stakeholder groups therefore appear not as spectators, but as forces whose interests and knowledge must shape the direction of European industrial policy.

For each group, the infographic sets out the question it raises, the danger it perceives, the course it proposes and the value it brings. This reveals that the same transformation appears differently depending on where one stands. Industry seeks competitiveness and returns; workers demand dignity and influence over decisions; regions and cities are concerned with the uneven geography of change; researchers defend knowledge and discovery; citizens and environmental voices demand that progress respect both society and the planet. These interests are not presented as enemies. Rather, the infographic argues that Europe is strongest when these different forms of knowledge are brought together.

The process is therefore one of continuous deliberation. The question begins with technological progress, but each stakeholder forces that question to become wider and more demanding. Citizens ask whether technology serves society. Workers ask whether automation preserves human agency. Researchers ask whether Europe possesses the knowledge to lead. Regions ask whether prosperity reaches every territory. Environmental voices ask whether growth can continue within planetary limits. The conversation ultimately arrives at the principle of "co-thinking together": decisions gain strength when they are tested against the experience and interests of those who must live with their consequences.

At the centre of the infographic stand the strategic issues that Europe must confront. These are not simple problems awaiting technical solutions, but opposing pressures that must be reconciled: productivity with employment, automation with human agency, efficiency with resilience, growth with planetary limits, scale with diversity, technological leadership with dependence, innovation with regulation, and globalisation with strategic autonomy. Here lies the true challenge of Industry 5.0. Europe must advance without surrendering control; automate without diminishing the human being; compete without abandoning solidarity; and remain open to the world without becoming dependent upon it.

The emerging vision is consequently broader than the technological logic of Industry 4.0. Where Industry 4.0 placed digitisation, connectivity and automation at the centre, Industry 5.0 places the human being, the machine, the planet and resilience within a single strategic conception. Human intelligence and dignity stand alongside artificial intelligence, robotics, digital technologies and biotechnology. Sustainability and circularity stand alongside productivity. Resilience and security stand alongside technological progress. The intelligent industrial society is therefore not defined simply by how much it produces, but by whether it can endure, adapt and prosper without sacrificing the conditions that make prosperity possible.

This vision is given practical form through five missions: humanity, prosperity, resilience, regeneration and intelligence. Humanity requires industry to serve human dignity and agency. Prosperity demands competitiveness and shared economic strength. Resilience requires Europe to withstand geopolitical, climatic and supply-chain shocks. Regeneration demands that industry operate within ecological limits and restore rather than merely consume natural resources. Intelligence requires Europe to master the technologies upon which its future will depend.

These ambitions are bound together by a common set of values: dignity, freedom and agency, innovation, competitiveness, solidarity, sustainability, resilience, inclusiveness, trust, technological sovereignty and openness. Their combination reveals the particular character of the European project. Europe does not seek sovereignty through isolation, nor openness through dependence. It seeks the capacity to remain open because it possesses the strength to choose its own course. Technological sovereignty must therefore exist alongside international cooperation; competitiveness alongside solidarity; innovation alongside responsibility.

Taken as a whole, the infographic is less a conventional industrial strategy than a declaration of how Europe should think about industrial power. It offers a common language before it offers a detailed programme, because without shared principles, investment and regulation risk pulling in different directions. Its deeper claim is that economic strength, social dignity and environmental responsibility should not be treated as separate objectives, with one sacrificed whenever another becomes urgent. They must be designed together from the beginning.

Industry 5.0 is therefore presented not merely as the next stage of industrial technology, but as an opportunity for Europe to redefine what industrial power itself means. The machine must serve the human; industry must respect the planet; technology must strengthen sovereignty; and prosperity must strengthen society. If Europe can unite these purposes, Industry 5.0 may become more than a technological transition. It may become a distinctly European model of power: competitive enough to prosper, sovereign enough to choose, resilient enough to endure, and human enough to command legitimacy.

Co-Thinking the Evolution of Industry 5.0

A European Multi-Stakeholder Dialogue on Vision, Challenges, Direction, Mission and Values

Industry 5.0 did not emerge from a single technological breakthrough, a single policy document or a single institutional vision. Rather, it can be understood as the outcome of an ongoing European conversation about the future of industry in an era characterised by digital transformation, geopolitical uncertainty, climate change, demographic shifts and growing societal expectations.

Unlike previous industrial paradigms, which were primarily driven by technological possibilities, Industry 5.0 begins with a broader question:

What kind of industrial future does Europe want to create?

Answering this question requires contributions from many actors. Governments, firms, workers, researchers, investors, regions, citizens and civil society each view industrial transformation through a different lens. Each stakeholder brings distinct priorities, concerns and aspirations. No single perspective is sufficient on its own.

The purpose of this co-thinking framework is therefore not to prescribe a predetermined solution, but to illustrate how a shared European vision can emerge through dialogue. By confronting different priorities and negotiating competing objectives, stakeholders progressively construct a more comprehensive understanding of industrial transformation.

From Stakeholder Perspectives to Collective Deliberation

The starting point is a simple but consequential premise: **no single stakeholder possesses a complete view of the industrial system**. Each occupies a different position within it and therefore apprehends a different dimension of what industrial transformation requires. The European Commission approaches the question through competitiveness, sustainability and strategic autonomy; industry through productivity, investment and technological adoption; workers through dignity, skills, participation and the quality of employment; researchers through the technological frontier and the convergence of artificial intelligence, robotics, advanced materials and biological systems; regions through territorial cohesion and place-based transformation; environmental actors through the ecological boundaries within which industrial activity must operate; citizens through the ultimate question of whether technological and economic progress improves collective wellbeing; investors through the creation of credible, scalable and long-term sources of value; and international partners through the openness, connectivity and interdependence upon which modern production depends. These are not merely competing interests. Taken together, they constitute different dimensions of the same question: **what should European industrial progress accomplish, and for whom?**

The significance of bringing these perspectives together lies precisely in the fact that none can, by itself, provide an adequate conception of Industry 5.0. If competitiveness is pursued without social legitimacy, technological progress may weaken rather than strengthen cohesion. If employment is protected without productivity and innovation, the industrial base may gradually lose the capacity upon which those very protections depend. If sustainability is separated from industrial competitiveness, ecological ambition may become economically fragile; if competitiveness is separated from ecological limits, it may prove equally unsustainable. If technological leadership is pursued without territorial inclusion, transformation may deepen rather than overcome Europe's existing economic divisions. The purpose of dialogue is therefore not to produce an artificial consensus in which differences disappear, but to identify the conditions under which apparently competing objectives can become mutually reinforcing.

The discussion may begin with a relatively narrow question: **How can Europe make its industry more technologically advanced?** Yet once the different perspectives are brought into the same deliberative space, the inadequacy of that question becomes apparent. Industry rightly demands that technology should raise productivity and strengthen competitiveness; workers insist that productivity should improve the quality and dignity of work rather than simply reduce its cost; regions require transformation to generate opportunities beyond established industrial centres; environmental actors demand that growth remain compatible with ecological limits; researchers point towards technological possibilities that increasingly blur the boundaries between human intelligence, artificial intelligence, robotics and biological systems; citizens ask that these developments ultimately serve human wellbeing; investors require predictable conditions under which long-term capital can be mobilised; and international partners remind Europe that resilience cannot mean isolation in an economy whose production networks, technologies and resources are inherently interconnected.

The question therefore changes in character. It is no longer simply how Europe can deploy more advanced technologies, but **how it can construct an industrial system in which technological capability, economic prosperity, social dignity, environmental responsibility, territorial cohesion and strategic resilience reinforce rather than undermine one**

another. This is the decisive movement from technology-centred thinking to systems thinking. Industry 5.0 becomes, in this sense, more than a technological paradigm. It becomes a proposition about the organisation of European productive power and about the purposes to which that power should ultimately be directed.

Such a proposition, however, cannot rest upon the expectation of permanent harmony. The industrial transformation of Europe necessarily generates tensions: between speed and deliberation, automation and employment, efficiency and resilience, openness and strategic autonomy, investment returns and wider social objectives, industrial expansion and ecological constraint, and market concentration and territorial cohesion. These tensions are not anomalies that can simply be removed from the policy process; they are structural features of the transformation itself. The task of governance is therefore not to deny them, but to determine how they can be mediated and, where possible, converted into sources of strength. Automation, for example, need not be understood solely as a substitute for labour if technological adoption is accompanied by investment in human capabilities; strategic autonomy need not imply economic isolation if it is conceived as the capacity to choose and withstand rather than the ambition to produce everything domestically; and sustainability need not stand against competitiveness if environmental constraints become incentives for technological renewal, resource efficiency and new forms of production.

The central challenge of Industry 5.0 is consequently a question of **institutional and political synthesis**. Europe must possess sufficient technological capacity to remain competitive, sufficient productive capacity to remain resilient, sufficient social capacity to make transformation legitimate, and sufficient ecological discipline to ensure that industrial progress remains viable over time. The different stakeholders do not merely provide inputs into this process; they reveal the conditions upon which its success depends. Their perspectives become meaningful precisely when they are connected within a common conception of industrial development.

Industry 5.0 should therefore be understood not as the addition of a human dimension to an otherwise technological industrial strategy, but as an attempt to redefine the relationship between technology, production and society. Its ambition is not simply to make European industry more advanced, but to ensure that the productive power created by technological change is translated into broader prosperity, resilience, sustainability and human flourishing. The measure of the transformation will consequently not be the speed with which Europe adopts new technologies, nor the volume of investment mobilised in isolation, but whether those technologies and investments become embedded in an industrial system capable of generating **productive strength, social legitimacy and long-term European wellbeing simultaneously**.

The point of departure is that no one participant in the industrial system can see the whole of what must be accomplished, because each is necessarily concerned with that part of the common enterprise upon which its own position depends. The Commission considers competitiveness, sustainability and strategic autonomy; industry productivity, investment and the adoption of new technologies; workers the dignity of labour, the acquisition of skills and the conditions under which technological change affects their lives; researchers the possibilities opened by the convergence of artificial intelligence, robotics, advanced materials and the biological sciences; regions the preservation of territorial cohesion and the transformation of places whose prosperity has long depended upon particular industrial structures; environmental actors the limits within which economic activity must remain compatible with the natural world; citizens the ultimate purpose of prosperity, namely whether the progress of industry contributes to the wellbeing of society; investors the conditions under which capital can be committed with confidence to productive activity over the long term; and international partners the openness and interconnectedness without which no modern industrial economy can secure either its markets or its resources. These interests differ in their immediate objects, but they need not differ in their ultimate purpose. For each, in its own way, raises the question of what Europe must possess if its industry is to remain not merely productive, but capable of supporting the prosperity, security and freedom of its society.

It is for this reason that the question with which the discussion begins—how Europe may make its industry more technologically advanced—is insufficient unless it is enlarged by the considerations which technology alone cannot answer. Industry is right to demand that technological progress increase productivity; workers are right to demand that productivity improve the quality and dignity of work rather than merely diminish its cost; regions are right to insist that transformation should not strengthen only those centres which are already strong; environmental actors are right to require that industrial ambition remain within ecological limits; researchers are right to draw attention to technologies whose consequences extend beyond the present organisation of production; citizens are right to ask whether the wealth created by these changes serves society as a whole;

investors are right to require conditions capable of sustaining long-term commitment; and international partners are right to remind Europe that resilience is not achieved by withdrawing from interdependence, but by possessing sufficient capacity within interdependence to withstand disruption and retain the freedom to act.

Thus the original question changes as soon as these perspectives are considered together. The issue is no longer merely whether Europe can adopt more advanced technologies, but whether it can organise those technologies, the capital that finances them, the skills that operate them, the institutions that govern them and the productive capacities that sustain them into an industrial order in which competitiveness strengthens resilience, innovation strengthens employment, sustainability strengthens productivity, and technological progress contributes to human wellbeing. What first appeared to be a question of technology therefore becomes a question of political economy: **what kind of productive system should Europe build, and to what end should its productive power be directed?**

This is the essential movement from a technology-centred conception of Industry 5.0 to a systemic one. For technology does not operate in isolation: it requires capital, skills, infrastructure, energy, institutions and markets; productivity does not arise from machines alone, but from the organisation of human and technological capabilities; resilience does not consist in producing everything at home, but in possessing the capacity to maintain essential functions when external conditions change; and sustainability does not simply impose a limit upon industrial development, but can become a source of innovation when environmental constraints induce more efficient technologies, new materials, different production processes and more durable forms of value creation. What is required, therefore, is not the reconciliation of interests by reducing them to a common denominator, but their ordering within a broader conception of the common interest in which each objective derives greater strength from its relationship with the others.

Yet such an undertaking cannot proceed upon the assumption that these objectives will naturally coincide. The transformation of industry necessarily brings tensions between efficiency and resilience, automation and employment, openness and strategic autonomy, investment returns and wider social purposes, industrial expansion and ecological constraint, technological concentration and territorial cohesion. These tensions are not evidence of failure; they are the inevitable consequence of attempting to transform a complex productive system while preserving the social and political conditions upon which its legitimacy depends. The task of policy is therefore not to pretend that such conflicts do not exist, but to determine which can be reconciled, which must be balanced, and which require institutional choices about the direction in which European industry should develop.

The importance of Industry 5.0 lies precisely here. Its purpose cannot be exhausted by placing human beings alongside machines, nor by adding sustainability and resilience to an otherwise conventional programme of technological modernisation. Its greater significance lies in the attempt to determine the relationship between technological capability and the purposes of economic life: to ensure that innovation creates productive strength without diminishing human agency; that competitiveness does not come at the expense of social cohesion; that resilience does not become isolation; and that industrial growth remains compatible with the ecological conditions upon which prosperity ultimately depends. In this sense, the several perspectives brought into the process are not obstacles to a common industrial strategy but the means through which such a strategy can acquire substance.

The measure of Industry 5.0 must therefore be found not in the number of technologies adopted, projects financed or investments announced, but in whether Europe succeeds in converting these separate advances into a coherent productive order. If technology raises productivity but weakens social capacity, the transformation is incomplete; if investment expands production without creating lasting capabilities, it is fragile; if industrial growth increases output while exhausting the resources upon which future production depends, it is self-defeating; and if technological leadership benefits only a narrow part of Europe, it cannot provide the durable political foundation required for a common industrial future. The objective must instead be a form of industrial development in which technological progress, economic strength, social dignity, territorial cohesion and ecological responsibility are brought into a durable relation, so that each strengthens the conditions upon which the others depend.

Only in this sense can Industry 5.0 become more than a new description of technological change. It can become a conception of European industrial development in which the advancement of productive power is measured by the extent to which that power enlarges the capacity of society itself: to prosper, to adapt, to withstand disruption, to innovate, and ultimately to determine its own economic future.

Summary

The logic of the framework can therefore be summarised as a sequence:

Stakeholder Perspectives

↓

Collective Dialogue

↓

Strategic Tensions

↓

Shared Vision

↓

Mission and Operational Pillars

↓

European Values

↓

Industry 5.0 as a Societal–Industrial Paradigm

Viewed through this lens, Industry 5.0 is not simply the next stage of industrial modernisation. It is a European attempt to redefine the relationship between technological progress, economic competitiveness, social wellbeing and planetary responsibility, transforming industrial policy from a question of production efficiency into a broader project of societal development. Rather than asking how technology can make factories smarter, it asks how industry can make societies more prosperous, resilient, inclusive and sustainable. Its central ambition is to align industrial transformation with Europe's deepest economic, social and democratic values, ensuring that technological advancement strengthens rather than weakens human agency. In this sense, Industry 5.0 represents a shift from optimising industrial systems to shaping socio-technical systems that create value simultaneously for people, the economy and the planet. It repositions industry as a strategic instrument not only of economic growth, but of societal resilience, territorial cohesion and long-term collective wellbeing. Ultimately, it offers a distinctly European vision of progress in which industrial power, technological capability and human flourishing evolve together within the ecological boundaries of a shared future.

19. Simulated European Co-Thinking Dialogue on the Unresolved Question of EU Industrial Policy

The discussion begins not with a question about funding, but with a deeper concern about knowledge.

The European Commission opens the dialogue:

For more than a decade, the European Union has expanded its industrial-policy toolbox through programmes, missions, financial instruments, strategic initiatives and regulatory interventions. Yet do we truly understand the causal effectiveness of these interventions? Can we demonstrate how European resources translate into investment, productive capacity, competitiveness, resilience and ultimately economic growth?

A brief silence follows.

The question exposes a fundamental weakness in the contemporary literature. Much is known about policy instruments, governance arrangements and programme implementation. Comparatively less is known about the causal mechanisms through which industrial policy reshapes the long-term productive potential of the European economy.

The Additionality Problem

The first response comes from the European Investment Bank and financial actors.

We routinely measure leverage. We can often estimate how many euros of private investment accompany each euro of public support. But leverage is not the same as additionality.

The distinction immediately becomes central.

Industry responds:

Indeed, the existence of co-financing does not prove that investment would not have occurred anyway. Many firms receiving support are already planning investment. The critical question is whether public intervention changed the scale, timing, location or technological ambition of that investment.

The academic community intervenes.

This is fundamentally a counterfactual problem. We observe what happened, but not what would have happened in the absence of intervention. Without a credible counterfactual, additionality remains largely assumed rather than demonstrated.

Researchers note that much evaluation still focuses on project-level outcomes rather than aggregate economic effects. While individual programmes may demonstrate positive impacts, the broader European question remains unresolved:

Does EU industrial policy create genuinely new productive capacity, or does it merely redistribute investment that markets would have generated regardless?

The discussion gradually reveals that additionality is not a technical detail but the foundation upon which any claim of policy effectiveness rests.

The Missing Causal Chain

The European Court of Auditors, imagined within the dialogue as the voice of evaluation and accountability, raises a second concern.

Even where additional investment can be demonstrated, the causal chain often disappears beyond that point. We know relatively little about how budgetary inputs translate into productivity gains and long-term growth.

The Commission acknowledges the criticism.

Much policy evaluation remains concentrated on immediate outputs:

- projects funded;
- firms supported;
- jobs created;
- investment mobilised.

Yet these indicators reveal little about whether interventions alter the long-run productive trajectory of the economy.

The research community expands the argument:

Industrial policy evaluation often stops precisely where the most important economic questions begin. Mobilised investment is not the final outcome. It is merely an intermediate step.

The relevant sequence should instead be:

Budgetary inputs

→ investment mobilization

→ additional investment

→ productive capacity

→ innovation and technological capability

→ productivity growth

→ potential GDP

The researchers pause before adding:

The greatest methodological gap in the literature may not concern policy design, but our limited understanding of the links between these stages.

Strategic Autonomy: Concept or Measurable Outcome?

At this point the conversation shifts toward strategic autonomy.

The Member States speak first.

Strategic autonomy has become one of the defining concepts of European industrial policy. Yet what exactly are we measuring when we claim that Europe has become more autonomous?

The question provokes considerable debate.

Industry cautions against simplistic interpretations.

No advanced economy can be fully autonomous. European competitiveness depends upon participation in global value chains. Complete self-sufficiency is neither realistic nor desirable.

International partners agree.

Interdependence is not inherently a vulnerability. Much interdependence is economically beneficial and contributes to innovation, efficiency and prosperity.

The challenge, therefore, is conceptual.

The security and geopolitical community reframe the issue:

The relevant distinction is not dependence versus independence. It is beneficial interdependence versus strategically dangerous dependence.

Researchers then identify a significant gap.

The literature often discusses strategic autonomy normatively, but far less frequently operationalises it empirically. We lack robust indicators capable of measuring changes in resilience, vulnerability and strategic capability over time.

The dialogue converges on a shared concern:

Europe possesses increasingly sophisticated concepts but comparatively underdeveloped metrics.

Competitiveness, Resilience and Strategic Autonomy: Three Objectives or One?

The conversation then reaches a more fundamental issue.

The European Commission observes:

Much policy analysis treats competitiveness, resilience and strategic autonomy as distinct policy objectives. Yet reality may be more complex.

Industry responds immediately.

For firms, these objectives are often inseparable.

A semiconductor manufacturer offers an example.

Investment in advanced chip production may:

- increase productivity;
- generate technological learning;
- strengthen domestic supply capacity;
- reduce dependence on external suppliers;
- improve resilience to geopolitical disruption;
- enhance Europe's strategic bargaining power.

The same intervention simultaneously produces economic and strategic effects.

The research community develops the argument further.

Competitiveness, resilience and strategic autonomy may be better understood as different manifestations of underlying industrial capability.

In other words, a stronger industrial base generates multiple forms of value at once.

The challenge is analytical.

If productivity gains and resilience gains emerge from the same investment, evaluators must avoid both double-counting and artificial separation.

The dialogue gradually moves toward a more integrated perspective:

Industrial capability may be the common source from which competitiveness, resilience and strategic autonomy jointly emerge.

The Growth-Theory Gap

The final stage of the discussion introduces perhaps the most profound unresolved issue.

The macroeconomists enter the conversation.

They pose a deceptively simple question:

Why does industrial policy matter economically?

The room offers familiar answers:

Investment.

Jobs.

Innovation.

Exports.

The economists remain unconvinced.

These are mechanisms, not ultimate outcomes.

They argue that much industrial-policy research remains disconnected from the analytical framework of long-run economic growth.

The central issue is not whether policy increases investment today.

It is whether policy increases the economy's future productive potential.

The discussion therefore shifts from observable outputs to deeper drivers of growth:

- capital accumulation;
- total factor productivity;
- technological diffusion;
- human capital formation;
- innovation capability;
- structural transformation;

- productive capacity.

The economists summarise:

Industrial policy matters because it may influence potential GDP. Everything else is intermediate.

The observation changes the tone of the discussion.

Many participants realise that industrial policy has frequently been evaluated through short-term indicators because these are easier to observe and measure. Yet the true significance of industrial transformation lies in effects that unfold over decades rather than years.

Toward a New Research Agenda

As the dialogue draws to a close, the Commission attempts a synthesis.

Perhaps the unresolved question is not whether industrial policy works, but whether we possess the analytical framework necessary to understand how it works.

The stakeholders gradually converge around a common conclusion.

The next generation of research should focus less on programmes in isolation and more on the causal architecture linking intervention to economic transformation.

The central question becomes:

How do EU industrial-policy resources affect the productive capacity of the European economy through their influence on investment behaviour, technological capabilities, industrial resilience and productivity growth?

From this perspective, four major research frontiers emerge:

1. Additionality
   — determining whether public intervention creates genuinely new investment and productive capacity.

2. Strategic autonomy and resilience
   — distinguishing beneficial interdependence from critical vulnerability and developing measurable indicators of resilience.

3. Integrated industrial capability
   — understanding how competitiveness, resilience and strategic autonomy interact and reinforce one another.

4. Potential GDP
   — connecting industrial-policy interventions to long-run productivity, structural transformation and economic growth.

The dialogue concludes with a final reflection from the collective stakeholder council:

The ultimate test of EU industrial policy is neither how much money is spent nor how many projects are funded. It is whether public intervention changes the developmental trajectory of the European economy itself—creating productive, technological and strategic capabilities that would otherwise not have emerged, and thereby expanding Europe's capacity for prosperity, resilience and self-determined action in an increasingly uncertain world.

In this sense, the unresolved question of industrial-policy effectiveness is simultaneously an economic, technological and political question. It concerns not merely whether Europe invests, but whether those investments alter the future possibilities of European development.

20.Strengthening Governance of EU Industrial Policy and Moving Towards a 5% EU Budget Allocation

20.1 From a fragmented competence to a coherent industrial-policy framework

The principal weakness of the EU's industrial-policy framework is not the complete absence of legal competence, but the fragmentation of that competence across different Treaty provisions, institutions, programmes and policy areas. Article 173 TFEU establishes a specific Union role in industry and requires the Union and Member States to ensure the conditions necessary for the competitiveness of European industry. It also requires Member States to coordinate their industrial actions and allows the Union to contribute to this coordination. However, Article 173 does not provide the Union with a comprehensive power to direct industrial development, nor does it establish a dedicated industrial-policy budget. The contemporary EU industrial strategy therefore depends upon a combination of Article 173 and other legal bases, particularly Article 114 on the internal market, Articles 101–109 on competition and State aid, Articles 179–190 on research and technological development, Article 194 on energy, Articles 191–193 on environmental policy, Articles 170–172 on infrastructure, and Articles 206–207 on trade.

The first step towards strengthening industrial governance should therefore be to clarify and consolidate the existing legal architecture rather than immediately seek Treaty amendment. A new interpretative and

legislative framework could establish industrial competitiveness, resilience, technological capability, decarbonisation and strategic economic security as interconnected dimensions of European industrial policy. Such an approach would preserve the existing Treaty settlement while giving greater coherence to the numerous competences already available to the Union.

20.2 Strengthening Article 173 TFEU

The first legal reform should concern the practical implementation of Article 173. The provision should become the explicit coordinating centre of EU industrial policy rather than functioning primarily as a general statement of objectives. The Commission could develop a comprehensive European Industrial Policy Framework Regulation under the appropriate Treaty legal bases, establishing common objectives, governance procedures, monitoring mechanisms and industrial-policy indicators.

Such legislation could define European industrial policy around several pillars: competitiveness, productivity, innovation, strategic technologies, energy security, decarbonisation, supply-chain resilience, skills, infrastructure and international industrial partnerships. This would not create an unlimited EU industrial competence. Instead, it would establish a common framework for coordinating measures already permitted under existing Treaty provisions.

The legislation could also establish an obligation for the Commission to produce a European Industrial Strategy every five years, accompanied by an implementation programme and measurable targets. Member States could be required to submit national industrial strategies showing how their policies contribute to European objectives.

20.3 A stronger legal coordination mechanism

Article 173 already envisages coordination between Member States. This should be transformed into a more systematic governance mechanism. Each Member State could designate a national industrial-policy coordinator responsible for ensuring coherence between national industrial policy and EU objectives.

These national coordinators could form a European Industrial Policy Council or Industrial Competitiveness Network, operating alongside existing Council structures. The body would not replace the Council of the EU but would provide a permanent mechanism for comparing national strategies, identifying cross-border investment opportunities and coordinating industrial priorities.

The Commission could then publish an annual European Industrial Competitiveness Report assessing Member-State performance against common indicators. These indicators could include productivity growth, private investment, R&D expenditure, clean-technology production, strategic dependencies, export performance, energy costs and industrial employment.

20.4 Strengthening the institutional position of the Commission

The Commission should have a clearly identifiable institutional centre for industrial policy. DG GROW should function as the principal coordinating Directorate-General, but industrial policy should become a genuine cross-Commission responsibility.

A Commission Vice-President for Competitiveness and Industrial Strategy could coordinate the relevant Commissioners and DGs. The Vice-President would bring together DG GROW, DG COMP, DG TRADE, DG RTD, DG CNECT, DG ENER, DG CLIMA, DG ENV, DG MOVE, DG REGIO, DG EMPL, DG ECFIN, DG BUDG and DG INTPA.

This would solve an important governance problem: industrial policy currently cuts across numerous policy domains, but no single institutional mechanism fully integrates them. A stronger coordination structure would allow the Commission to assess whether competition policy, climate policy, trade policy, energy policy and research policy collectively reinforce European industrial objectives.

20.5 Strengthening the European Parliament

The European Parliament should receive a stronger coordinating role through its relevant committees. ITRE should remain the principal parliamentary committee for industrial policy, but systematic coordination should be established with ECON, INTA, ENVI, TRAN, BUDG, REGI and EMPL.

A cross-committee Industrial Competitiveness Forum could examine major industrial legislation and monitor the implementation of the European Industrial Strategy. This would prevent industrial policy from being considered separately from trade, energy, climate, transport, research and budget policy.

Parliamentary scrutiny should also extend to the proposed 5% allocation. The Commission should be required to demonstrate how the expenditure contributes to measurable European industrial objectives rather than simply increasing programme expenditure.

20.6 Strengthening the Council structure

The Council's Competitiveness Council should become the principal political forum for coordinating national industrial policy. However, because industrial policy intersects with energy, transport, environment, trade and finance, the Competitiveness Council should operate through a more systematic coordination mechanism with ECOFIN, TTE, Environment and Foreign Affairs.

The Council's working-party system should similarly be strengthened. Industrial-policy questions should be coordinated across the relevant working parties rather than treated in isolation. COREPER should have a clearer role in resolving conflicts between industrial, competition, climate, energy and trade objectives before legislation reaches the Council.

This would transform industrial policy from a series of sectoral negotiations into a more coherent strategic process.

20.7 Linking EU and national industrial strategies

The greatest governance challenge is the relationship between the Union and Member States. National governments control important instruments including taxation, public procurement, infrastructure, skills, investment incentives and national development banks. The Union therefore cannot implement industrial strategy without Member States.

A strengthened system should require every Member State to prepare a National Industrial Competitiveness Strategy consistent with the European strategy. The objective should not be uniformity. Member States should retain flexibility to specialise according to their industrial structures.

The EU should instead identify areas where national strategies can generate European spillovers. A national battery industry, for example, becomes more valuable when connected to European automotive manufacturers, energy infrastructure, research institutions and recycling systems.

20.8 Reforming State-aid governance

State-aid policy is perhaps the most important area requiring institutional reform. The relaxation of State-aid rules has given Member States greater capacity to support strategic industries, but it has also increased the possibility of fiscal fragmentation.

A stronger system should therefore combine greater flexibility for strategic investment with stronger European coordination. The Commission could identify categories of investment that qualify for accelerated State-aid approval where they contribute to European strategic objectives.

At the same time, Member States receiving particularly large amounts of industrial aid should demonstrate how their projects contribute to European rather than exclusively national value chains.

The principle should be:

greater national flexibility in exchange for stronger European coordination.

20.9 Creating a European Industrial Investment Facility

The legal and institutional reforms should culminate in a dedicated financial mechanism. Rather than establishing dozens of new programmes, the EU could consolidate relevant resources into a European Industrial Investment Facility.

The facility could combine resources currently dispersed across research, innovation, cohesion, investment, energy, digital and industrial programmes. It could operate through grants, guarantees, equity, loans and blended finance.

The EIB should become a principal implementing partner. The European Investment Fund could support SMEs and scale-ups, while national promotional banks could co-finance projects.

This would create a European financing chain:

EU budget → guarantees/grants → EIB/national banks → private investment → industrial capacity → productivity and GDP growth.

20.10 The logical route towards 5%

Only after these legal and governance reforms should the proposal to reach 5% of the EU budget be introduced.

The 5% should therefore be presented as a medium-term political and financial target, rather than an immediate budgetary jump. It should cover an integrated industrial and competitiveness envelope encompassing strategic technologies, research commercialisation, clean industry, critical raw materials, energy infrastructure, digitalisation, industrial connectivity, skills and investment.

The transition could occur progressively through successive Multiannual Financial Frameworks.

The principle could be:

Phase I: consolidate existing industrially relevant expenditure.

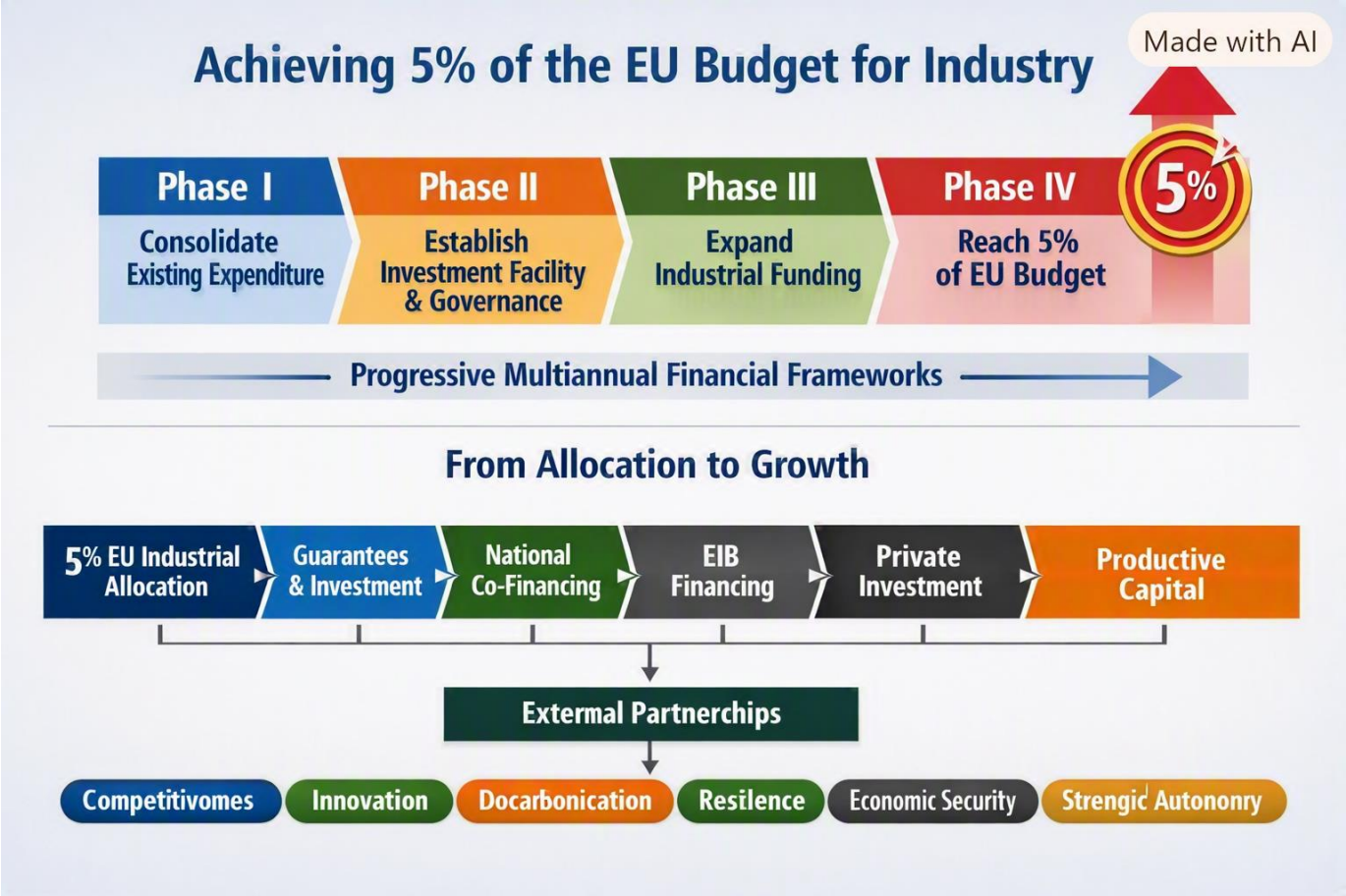
Phase II: establish the Industrial Investment Facility and governance framework.

Phase III: progressively increase the industrial envelope.

Phase IV: reach approximately 5% of the EU budget once the institutional and monitoring framework is operational.

This sequencing is crucial because increasing expenditure without reforming governance could simply reproduce fragmentation.

FIGURE



20.11 How to reach 5% without simply increasing the EU budget

There are several ways to reach the target.

First, the EU could reclassify and consolidate existing industrially relevant expenditure currently distributed among different programmes. Research, innovation, strategic technologies, clean industry, infrastructure and investment already receive significant EU resources.

Second, future Multiannual Financial Framework negotiations could allocate a larger share of expenditure explicitly to industrial competitiveness.

Third, the EU could increase the use of guarantees and financial instruments, allowing relatively limited budgetary appropriations to mobilise larger volumes of EIB and private capital.

Fourth, the EU could establish stronger co-financing requirements, linking EU funding to Member-State and private investment.

Fifth, unused or inefficient programme resources could be redirected towards strategic industrial priorities.

Sixth, revenues from certain EU-level instruments could potentially contribute to industrial investment, subject to

the applicable legal and budgetary framework.

The objective should therefore be to make 5% of the EU budget the catalytic core of a much larger European industrial investment effort.

20.12 Why 5% can matter for GDP growth

The economic argument should not be that allocating 5% automatically generates a corresponding increase in GDP. The argument should be that a larger and better coordinated industrial budget can increase the EU's productive capacity through investment, productivity and innovation.

The relevant mechanism can be expressed as:

5% EU industrial allocation → EU guarantees and investment → national co-financing → EIB financing → private investment → productive capital → innovation → productivity → competitiveness → higher potential GDP.

The critical variable is therefore the leverage and productivity of the expenditure.

If each euro of EU budgetary support mobilises several euros of additional investment, the economic significance of the 5% allocation becomes considerably greater than its nominal budgetary share.

20.13 The 5% should be conditional on performance

The allocation should not be unconditional. Funding should be linked to measurable industrial outcomes.

Projects should demonstrate their contribution to:

productivity; R&D commercialisation; strategic technologies; European value chains; clean manufacturing; energy security; critical-resource resilience; SME scaling; exports; skills; and regional convergence.

The Commission should conduct regular impact assessments, while Parliament and the Court of Auditors should provide scrutiny.

A European Industrial Policy Scoreboard could rank programmes and Member States according to the additional investment and economic capacity generated.

20.14 Industrial policy and external partnerships

The strengthened governance structure should also include an explicit external dimension. European industrial competitiveness increasingly depends upon access to raw materials, energy, technologies, infrastructure and markets outside the EU.

The Critical Raw Materials Act provides a particularly important example because it links internal industrial resilience with diversified external supply. This creates a legal and strategic basis for deeper industrial partnerships with resource-rich countries.

For your Central Asian dimension, this is where the argument becomes particularly strong.

The EU could use part of its strengthened industrial investment architecture to support sustainable processing and value-added production in partner countries, rather than merely importing raw materials. Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan and Turkmenistan could therefore be considered within differentiated industrial and connectivity strategies.

For Kazakhstan in particular, the combination of critical raw materials, renewable energy, transport corridors, digital connectivity and industrial processing provides a potential bridge between European industrial policy and Central Asian development.

20.15 The overall governance model

Figure Stylised Organigramme



The organigramme depicts a dual-ring governance system in which the European Commission sits at the centre as the primary integrator of industrial strategy. Around the Commission, several functional nodes orbit, including national coordinators, funding and investment bodies, research and innovation networks, and legal and regulatory frameworks. The European Industrial Policy Council appears above the Commission as the strategic apex that receives analytical input and industrial signals rather than issuing hierarchical commands. The European Parliament and the Council of the EU are positioned at the top to indicate their legislative and policy-setting roles without implying operational control over industrial missions. The bottom of the diagram shows Europe's major strategic value chains, which act as the industrial foundation that pushes governance upward. These value chains represent large industrial ecosystems such as semiconductors, AI, raw materials, biotech, clean energy, aerospace, defence, and advanced manufacturing. Their upward arrow signifies that industrial capabilities and competitive pressure shape policy direction rather than the reverse. The organigramme separates Industry 5.0 from the strategic value chains to reflect its SME-centric nature. Industry 5.0 is shown as a transformation layer focused on human-centric production, digitalisation, skills, and regional innovation.

This separation clarifies that Industry 5.0 does not belong to the strategic dialogue with large industrial actors. A bridge node between the rings represents the interface through which SMEs connect to large industrial ecosystems. This interface supports technology diffusion, supply-chain integration, and joint innovation programmes. National coordinators are depicted as a staff function that provides industrial intelligence and implementation support rather than political steering. The Commission's central placement highlights its role in coordinating missions across DGs and aligning funding, regulation, and industrial partnerships. External partnership vectors toward the United States and China illustrate Europe's strategy of selective cooperation and de-risking rather than autarky. The curved and diagonal arrows throughout the organigramme emphasise feedback loops instead of hierarchical command chains. The overall geometry conveys a shift from intergovernmentalist structure to ecosystem-driven governance. The organigramme expresses that industrial power emerges from coordinated value chains rather than institutional

layering. The final message is that Europe's industrial strategy must be organised around missions, ecosystems, The proposed model can therefore be represented as:

Treaties

↓

Strengthened Article 173 coordination framework

↓

European Industrial Policy Framework Regulation

↓

European Industrial Strategy

↓

Commission Vice-President / DG GROW coordination

↓

Parliament + Council + specialised committees and working parties

↓

Member-State Industrial Strategies

↓

European Industrial Investment Facility

↓

EIB + national promotional banks + private capital

↓

Strategic industrial projects

↓

Innovation + productivity + resilience + decarbonisation

↓

Higher European competitiveness and potential GDP growth

↓

and capabilities rather than bureaucratic hierarchy.

External industrial partnerships with strategic regions including Central Asia

20.16 Core argument

The proposal can therefore be formulated in a more rigorous way:

The EU should strengthen its industrial-policy legal basis not primarily by creating an entirely new Union competence, but by operationalising Article 173 TFEU through a comprehensive European Industrial Policy Framework that coordinates the Union's existing internal-market, competition, research, energy, climate, infrastructure, trade and investment competences. This legal reform should be accompanied by stronger coordination between the Commission, Parliament, Council and Member States, a dedicated European Industrial Investment Facility and systematic alignment of national industrial strategies with European priorities. Once this governance architecture is established, the EU should progressively increase the share of its budget devoted to an integrated industrial and competitiveness strategy, with a medium-term objective of approximately 5% of the EU budget. The purpose of the 5% allocation would not be expenditure for its own sake, but to use EU resources as a catalyst for substantially larger national, EIB and private investment, thereby increasing European productive capacity, technological capability, productivity, resilience and ultimately potential GDP growth.

This gives a much stronger causal chain for the chapter:

LEGAL BASIS → GOVERNANCE REFORM → COORDINATION → FINANCIAL ARCHITECTURE → 5% TARGET → LEVERAGED INVESTMENT → PRODUCTIVITY → GDP GROWTH → EXTERNAL INDUSTRIAL PARTNERSHIPS.

20.17 Policy-relevance ?

In policy-relevant terms, the European Commission's European Industrial Strategy establishes an advanced analytical paradigm that transcends the traditional dichotomy between defensive insulation and market-driven climate adjustment. By positioning the Union's regulatory ecosystem as a synchronized mechanism for economic sovereignty, this framework avoids the structural pitfalls of both classical neo-mercantilism and ecological modernization.

Framework Dimensions	Protectionist Approach	Transitionist Approach	Our Synthesized Approach
Primary Economic Objective	Insulate domestic markets from external competitive shocks.	Catalyze rapid decarbonization via market incentives.	**Synthesize economic resilience with technological acceleration.**
Supply Chain Mechanism	Trade barriers, quotas, and punitive import tariffs.	Globalized sourcing focused on immediate low-cost procurement.	**Codified domestic diversification benchmarks and active risk-mitigation.**
Regulatory Philosophy	Defensively anti-competitive and structurally restrictive.	Environmentally prescriptive, occasionally risking domestic leakage.	**Streamlined, proactive administrative workflows to build long-term capacity.**
Human Capital Focus	Preserve existing labor configurations via sector subsidies.	Promote generalized service-sector shifts or passive welfare safety nets.	**Targeted, high-tech vocational restructuring via active upskilling.**

Classical protectionism relies on defensive market insulation and punitive tariffs to shield legacy domestic industries from foreign competition. In contrast, your framework emphasizes proactive capacity building, utilizing streamlined permitting under the Net-Zero Industry Act to establish next-generation manufacturing facilities rather than sustaining obsolete infrastructure.

While protectionist models champion economic autarky and trade restrictions, this approach pursues open strategic autonomy. Mechanisms like the Carbon Border Adjustment Mechanism do not block international trade, but rather equalize carbon pricing to maintain competitive fairness while the Global Gateway Initiative secures diversified external procurement networks.

Standard transitionist methodologies prioritize accelerated environmental goals through carbon pricing incentives, which frequently risks capital flight and carbon leakage due to uneven global regulations. Your synthesis mitigates this vulnerability by explicitly binding decarbonization to industrial security, transforming climate objectives into pillars of continental industrial growth.

Traditional transitionism relies on market-driven asset reallocation and manages labor displacement retroactively through passive social safety nets. Your framework introduces highly interventionist, de-risking financial tools like the European Hydrogen Bank alongside targeted human capital restructuring programs like the Pact for Skills to actively prepare the workforce for automated digital manufacturing.

Our conceptual synthesis makes a distinct contribution to contemporary political economy by redefining how supranational states navigate systemic crises, deep

decarbonization, and geopolitical rivalry. Rather than treating economic sovereignty and environmental sustainability as competing policy priorities, our framework integrates them into a single operational system.

The primary theoretical contribution lies in replacing the defensive, inward-looking focus of classical protectionism with a proactive capacity-building model. While protectionist approaches rely on trade barriers to shield legacy domestic markets from external shocks, our approach utilizes structural legislative tools to build local technological advantages from the ground up. This framework moves the academic debate away from economic isolationism and toward a model of open strategic autonomy, where international trade continues but is stabilized by diversified procurement networks and fair-pricing enforcement tools.

The secondary contribution provides an important correction to standard transitionist models, which often depend on market pricing and risk causing industrial flight to less-regulated regions. Our synthesis corrects this vulnerability by tying climate objectives directly to national security and supply chain sovereignty. By using targeted financial de-risking mechanisms alongside institutional programs for workforce upskilling, our framework converts environmental compliance into a direct driver of industrial growth and labor resilience. This structural model offers a highly integrated, legally grounded path forward for modern industrial policy.

21. From Output to Outcome and Impact of EU–Member-State Industrial Policy

The effectiveness of EU–Member-State industrial policy should be assessed not primarily by the amount of legislation adopted or public money spent, but by the outputs, outcomes and wider economic and societal impacts generated by those interventions. This distinction is particularly important for a European industrial policy that increasingly combines competitiveness, innovation, decarbonisation, resilience, economic security and strategic autonomy. A stronger governance system should therefore move from measuring administrative activity towards measuring whether industrial policy actually changes the productive structure and performance of the European economy.

21.1 From inputs to outputs

Inputs refer to the financial, institutional, regulatory and human resources committed to industrial policy. They include EU budget allocations, Member-State expenditure, EIB financing, research funding, State aid, guarantees, private co-financing and administrative capacity. The proposed increase towards 5% of the EU budget for an integrated industrial and competitiveness strategy would therefore constitute an increase in inputs.

Outputs, by contrast, are the immediate products of these inputs. They include research projects financed, industrial projects approved, companies receiving support, kilometres of infrastructure constructed, renewable-energy capacity installed, workers trained, patents supported, strategic partnerships concluded and new investment projects established.

Outputs are necessary but insufficient indicators of success. A programme can finance thousands of projects and still have limited effects on European competitiveness. Measuring the number of projects supported therefore tells us what government has done, but not whether the intervention has changed economic performance.

21.2 From outputs to outcomes

The next analytical level is the outcome. Outcomes measure the changes produced by policy interventions among firms, industries, workers, regions and markets.

For example, an industrial-policy programme may produce the output of financing research projects. The relevant outcome is whether that research generates commercially viable technologies, new firms, higher productivity or increased industrial investment. Similarly, training programmes should not be evaluated merely by the number of workers trained but by whether participants obtain higher-skilled employment and whether firms experience improvements in productivity.

Industrial outcomes should therefore include:

Policy area	Output	Outcome
Research	R&D projects financed	Commercial innovation and productivity

Industrial investment	Projects supported	Increased productive capacity
Digitalisation	Firms receiving support	Higher digital productivity
Clean industry	Green technologies installed	Lower energy/carbon intensity
Critical raw materials	Projects approved	More resilient supply chains
Infrastructure	Infrastructure constructed	Lower logistics and energy costs
Skills	Workers trained	Higher employment and productivity
SMEs	Firms receiving finance	Scaling-up and export growth
Trade	Agreements/partnerships	Increased market access
State aid	Firms/projects supported	Additional investment and capacity

This distinction should become central to EU industrial-policy governance.

21.3 From outcomes to impact

The highest level is impact. Impact concerns the broader structural consequences of industrial policy for the European economy and society.

The ultimate impacts should include higher:

productivity; potential GDP; investment; technological capability; industrial competitiveness; employment quality; export capacity; energy security; economic resilience; regional convergence; and environmental sustainability.

Industrial policy should therefore be evaluated according to whether it changes Europe's long-term productive potential.

The causal relationship can be represented as:

EU/MS resources → policy instruments → outputs → outcomes → structural impacts.

For example:

EU funding → semiconductor investment → new production capacity → greater European semiconductor supply → reduced strategic dependence + higher productivity → increased resilience and potential GDP.

21.4 Additionality as the central test

One of the most important principles should be additionality. The central question is not whether a subsidised project exists, but whether it would have occurred without public intervention.

If a company would have undertaken an investment entirely with private financing, public support may have generated little additional economic activity. If EU support enables a project that otherwise would not have occurred,

the intervention has much greater economic additionality.

Industrial-policy evaluation should therefore distinguish between:

deadweight effects, where public money finances activity that would have happened anyway;

substitution effects, where supported activity simply replaces activity elsewhere;

crowding-out, where public intervention displaces private investment;

and additional investment, where public intervention generates genuinely new economic activity.

The proposed 5% EU industrial allocation should therefore be explicitly conditional on demonstrating additionality.

21.5 Leverage and mobilisation of private investment

A second key indicator should be the investment leverage ratio.

The EU budget should be used to mobilise national and private capital rather than simply finance projects directly. If one euro of EU support generates several euros of additional private investment, the economic impact can be considerably greater than the original budgetary expenditure.

The evaluation framework should therefore measure:

EU contribution → Member-State contribution → EIB financing → private investment → total investment mobilised.

This is particularly important for capital-intensive sectors such as semiconductors, batteries, hydrogen, advanced materials, energy infrastructure and critical raw-material processing.

21.6 Productivity as the central economic outcome

Productivity should occupy a central position in the evaluation framework because long-term GDP growth ultimately depends heavily upon the economy's capacity to produce more value from its labour and capital resources.

Industrial policy should therefore assess whether supported interventions generate:

higher labour productivity; higher total factor productivity; better capital utilisation; technological upgrading; innovation; automation; and improved management and organisational performance.

This would prevent industrial policy from becoming simply a mechanism for preserving existing production structures. The objective should be productive transformation, not merely industrial preservation.

21.7 GDP growth and potential GDP

The relationship between industrial policy and GDP should be treated carefully. The immediate expenditure associated with industrial programmes can increase aggregate demand, but the more important effect should be an increase in potential GDP.

Potential GDP represents the sustainable productive capacity of the economy. Investment in technology, infrastructure, human capital and productive capital can increase that capacity.

The analytical chain is therefore:

industrial investment → capital accumulation + innovation + productivity → higher productive capacity → higher potential GDP.

The impact assessment of the proposed 5% allocation should consequently examine not simply short-term GDP effects but the longer-term contribution to productivity and potential output.

20.8 Innovation and technological impact

Innovation policy should be evaluated beyond the number of research grants awarded or patents produced. The relevant question is whether European research is successfully converted into commercially scalable technologies.

Indicators should therefore include:

R&D-to-market conversion; patents commercialised; start-ups created; scale-ups achieved; technology licensing; industrial deployment; private R&D investment; and European market share in strategic technologies.

This is particularly important because one of Europe's structural weaknesses has historically been the difficulty of converting strong research capabilities into globally dominant companies.

21.9 Industrial ecosystem effects

Modern industrial policy should also measure ecosystem effects rather than focusing exclusively on individual firms.

A semiconductor investment, for example, can create demand for specialised equipment, chemicals, software, logistics, engineering services and research. The impact therefore extends throughout the value chain.

The evaluation framework should consequently measure:

direct effects + indirect effects + induced effects + spillovers.

This would allow industrial policy to identify whether interventions create broader European industrial ecosystems rather than isolated subsidised projects.

21.10 Regional and territorial impact

Industrial policy also has important territorial consequences. EU–Member-State policy should therefore measure whether investment reduces or increases regional disparities.

Indicators should include:

regional productivity; industrial employment; investment per region; infrastructure connectivity; SME development; innovation capacity; and convergence in industrial performance.

This is particularly important because the relaxation of State-aid rules can favour Member States with greater fiscal capacity. EU-level funding should partly compensate for this tendency and ensure that strategic industrial development does not become concentrated in a small number of wealthy Member States.

21.11 Social and employment outcomes

Industrial transformation inevitably creates winners and losers. Industrial policy should therefore assess employment quality, skills and regional labour-market adjustment.

Outputs such as the number of training programmes should be connected to outcomes such as:

employment rates; wage growth; occupational mobility; skills utilisation; worker productivity; and successful transitions from declining to expanding sectors.

A successful industrial strategy should therefore combine competitiveness with social resilience.

21.12 Green industrial impact

The environmental impact of industrial policy should be measured alongside economic performance.

The key question should be whether industrial investment produces simultaneous improvements in competitiveness and environmental performance.

Relevant indicators include:

carbon intensity; energy efficiency; renewable-energy use; resource productivity; circularity; emissions reductions; clean-technology production; and energy costs.

This would operationalise the principle of the Clean Industrial Deal that decarbonisation should become a source of industrial competitiveness rather than simply an additional regulatory cost.

21.13 Resilience and economic-security impact

The new generation of EU industrial policy requires a further category of indicators: resilience.

A project may have limited immediate GDP effects but nevertheless be economically valuable because it reduces exposure to a major strategic dependency.

Indicators could include:

supplier diversification; import dependency; strategic stock capacity; domestic processing capacity; alternative supply routes; critical infrastructure resilience; and exposure to geopolitical disruption.

The Critical Raw Materials Act provides an important example of this approach because its objectives include diversification of supply, increasing European extraction, processing and recycling, and reducing vulnerabilities associated with excessive dependence on individual external suppliers.

21.14 External impact and industrial partnerships

The impact framework should also extend beyond the EU's borders.

Where European industrial resilience depends upon external suppliers, the impact of industrial policy should be measured through the quality and sustainability of international industrial partnerships.

This is especially relevant to Kazakhstan and Central Asia. The EU's industrial policy can create outcomes through strategic partnerships involving critical raw materials, renewable energy, transport corridors, processing capacity and technology transfer.

The impact should therefore not be measured solely by the

value of imports from Central Asia. It should also examine whether cooperation produces:

local processing; European investment; technology transfer; infrastructure development; diversification of supply; higher local value added; environmental improvements; and resilient EU–Central Asian value chains.

21.15 Governance indicators

The evaluation framework should also measure the quality of governance itself.

Relevant indicators include:

speed of programme implementation; administrative costs; regulatory predictability; coordination between EU and Member States; time required for State-aid approval; speed of permitting; absorption rates; project completion; and transparency.

This is essential because poor governance can neutralise otherwise adequate financial resources.

20.16 A European Industrial Policy Impact Dashboard

The Commission should therefore establish a European Industrial Policy Impact Dashboard combining EU-level and Member-State indicators.

The dashboard could be organised into six dimensions:

TABLE

Dimension	**Principal impact indicators**
Competitiveness	Productivity, unit costs, exports, market share
Innovation	R&D, patents, commercialisation, scale-ups
Investment	Private investment, capital formation, leverage
Resilience	Dependencies, diversification, strategic capacity
Green transition	Emissions, energy intensity, clean production
Social & territorial	Employment, skills, regional convergence

This would allow Parliament, Council, Commission and Member States to assess whether industrial policy is producing measurable results.

21.17 Evaluation of the proposed 5% allocation

The proposed 5% EU budget allocation should therefore be linked directly to this outcome and impact framework.

The 5% should not be regarded simply as a spending target. It should constitute a performance-based industrial investment envelope.

The logic should be:

5% EU budget → leveraged investment → measurable outputs → verified outcomes → structural economic impact.

Programmes that consistently fail to demonstrate additional investment, productivity, innovation or strategic value should be redesigned or discontinued.

Conversely, programmes demonstrating strong additionality and high economic returns should receive greater allocations.

This would create a feedback loop between budgetary allocation and measurable economic performance.

20.18 The EU–Member-State performance contract

A further institutional innovation could be a European Industrial Performance Framework between the Commission and Member States.

Member States receiving substantial industrial-policy funding could commit to measurable targets concerning investment, productivity, innovation, energy efficiency and strategic resilience.

The EU would provide funding and coordination, while Member States would provide national implementation and co-financing.

This would transform industrial policy from a predominantly expenditure-based system into a performance-based governance system.

21.19 The ultimate impact model

The complete framework can therefore be expressed as:

INPUTS → OUTPUTS → OUTCOMES → IMPACT

Inputs:
EU budget + Member-State resources + EIB + private finance

↓

Outputs:
Projects + infrastructure + research + training + industrial capacity

↓

Outcomes:
Investment + innovation + productivity + exports + resilience

↓

Impact:
Higher potential GDP + competitiveness + strategic autonomy + quality employment + territorial cohesion + sustainable industrial transformation.

This model provides the analytical bridge between the proposed 5% budget allocation and the ultimate objective of higher European economic growth.

SUMMARY

The central objective of EU–Member-State industrial-policy reform should therefore be to move from expenditure to performance, from outputs to outcomes and from individual projects to measurable structural impact. A larger industrial budget is justified only if it produces additional investment, technological upgrading, productivity gains and greater resilience. The proposed 5% allocation should consequently be embedded within a governance system that systematically measures additionality, leverage, productivity, innovation, regional effects, employment, decarbonisation and economic security.

The ultimate test of European industrial policy should not be how many regulations the EU adopts, how many projects it finances or how much money it distributes. It should be whether the intervention changes Europe's productive capacity.

The strongest analytical formulation for the chapter is therefore:

The effectiveness of EU industrial policy should be assessed through a transition from output-oriented to outcome- and impact-oriented governance. EU and Member-State expenditure should be judged by its additionality, investment leverage, productivity effects, technological spillovers, resilience benefits, social consequences and contribution to potential GDP. The proposed allocation of 5% of the EU budget to an integrated industrial and competitiveness strategy should consequently be conditional upon a measurable chain linking public inputs to industrial outputs, economic outcomes and long-term structural impacts. Such an approach would transform European industrial policy from a collection of expenditure programmes into a performance-based system for raising Europe's productive capacity, competitiveness and resilience.

22. EU–Member-State Industrial Policy: Integrated KPI Framework

The KPI framework should provide a simple results-based system for evaluating EU and Member-State industrial policy. It should connect the proposed 5% EU budget allocation to the ultimate objectives of higher investment, productivity, competitiveness, resilience and potential GDP growth.

The framework should distinguish between what is invested, what is produced, what changes as a result, and what long-term impact is generated:

INPUTS → OUTPUTS → OUTCOMES → IMPACT

Cross-tabulated KPI framework

The logic of the framework

The framework creates a clear causal chain:

5% EU budget allocation

↓

EU + Member-State + EIB + private investment

↓

Industrial projects + R&D + infrastructure + skills

↓

Additional investment + innovation + productivity

↓

Competitiveness + industrial capacity + resilience

↓

Higher potential GDP + employment + sustainable growth

This is important because 5% should be treated as an input target, not as an outcome. The policy is successful only if the additional resources produce measurable economic results.

Five headline KPIs

For political and institutional monitoring, the entire framework can ultimately be reduced to five headline indicators:

TABLE

Headline KPI	**What it measures**	**Central question**
Investment leverage	Total additional investment generated per €1 of EU funding	Is EU money mobilising national and private capital?
Productivity	Labour and total-factor productivity	Is industrial policy raising productive efficiency?
Competitiveness	Exports, market share, unit costs and industrial investment	Is European industry becoming more competitive?
Resilience	Critical dependencies and supply diversification	Is Europe becoming less vulnerable to external shocks?
GDP impact	Contribution to potential GDP growth	Is industrial policy increasing Europe's productive capacity?

The key methodological principle: additionality

The most important KPI principle should be additionality.

The question is not simply:

How much money was spent?

It is:

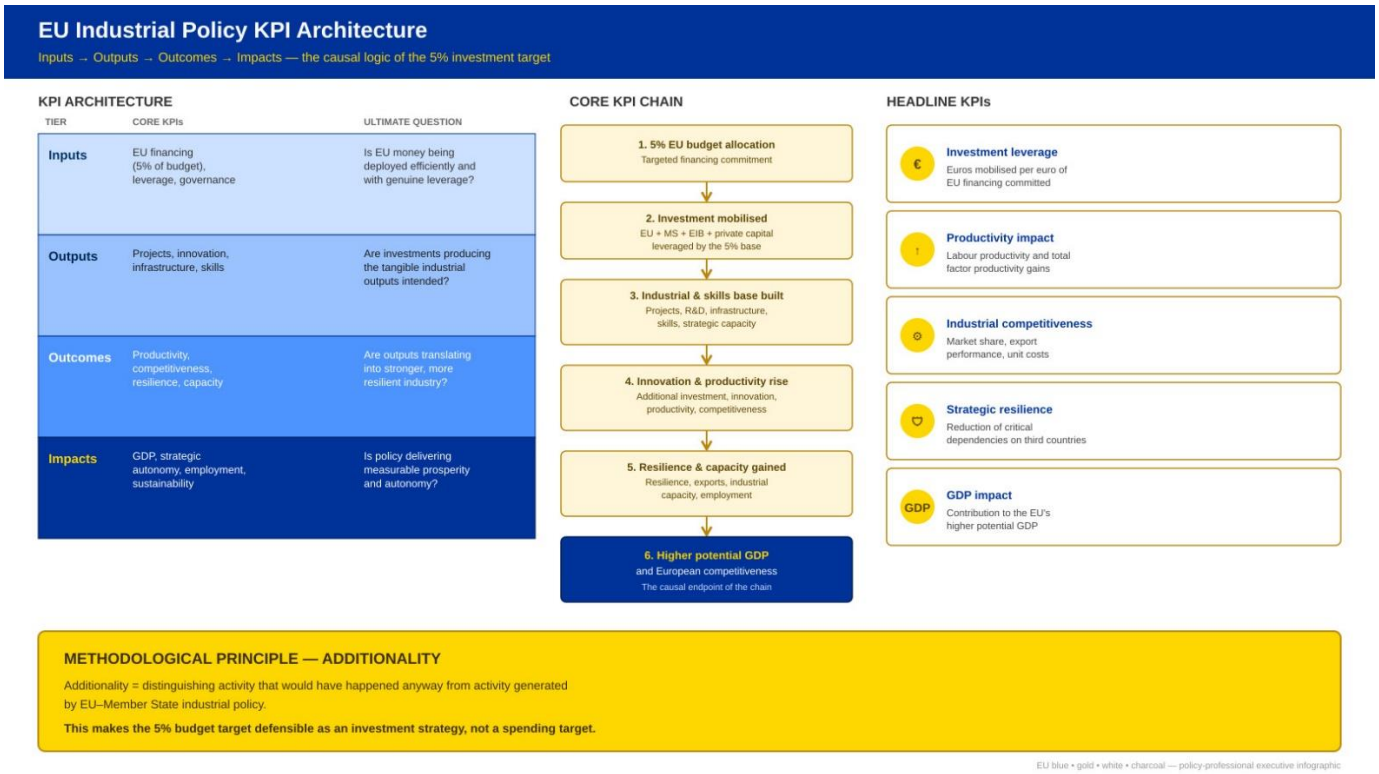
What economic activity occurred because of EU and Member-State intervention that would not otherwise have occurred?

This allows the framework to distinguish between expenditure and impact. A €1 billion programme that merely substitutes for private investment may have limited additional value, whereas €1 billion that mobilises €5–10 billion of genuinely additional investment and produces lasting productivity gains can have a much greater economic impact.

The framework therefore connects the proposed 5% EU budget target to a broader economic objective:

5% of the EU budget should become the financial input for a performance-based industrial strategy whose success is ultimately judged by additional investment, productivity, competitiveness, resilience and potential GDP growth.

Figure



KPI Architecture and Causal Logic

To make the proposition intelligible, we develop a KPI architecture that traces the movement from public resources to industrial transformation: from allocation to mobilisation, from mobilisation to production, from production to productivity, from productivity to competitiveness, and from competitiveness to resilience and long-term economic impact. The starting point is the proposed allocation of 5% of the EU budget to industrial policy and competitiveness. Yet money is not impact, and allocation is not achievement. The 5% is an input, not an outcome; its significance lies in what it sets in motion.

The central question is therefore not simply how much Europe spends, but what that spending makes possible. Does public money merely substitute for investment that would have occurred anyway, or does it unlock investment that otherwise would not have materialised? Does funding create isolated projects, or does it create an industrial ecosystem? Does Europe merely spend, or does it mobilise, multiply and transform? The first causal relationship is consequently between EU funding and investment mobilisation, making additionality and investment leverage fundamental components of the framework.

Public money mobilises private capital; private capital expands productive capacity; productive capacity generates economic value. The effectiveness of the initial allocation therefore depends on the extent to which EU resources are combined with Member-State financing, EIB support and private-sector investment. The greater the additional investment generated by each euro of EU funding, the stronger the leverage effect. Here lies the first paradox of the framework: the success of public investment may be measured partly by how much

investment it makes possible beyond itself.

The second stage concerns the transformation of mobilised finance into tangible industrial outputs. These include industrial projects, research and development, infrastructure, skills, clean technologies and strategic production capacity. But outputs do not stand alone. Infrastructure enables technology; technology requires skills; skills increase productivity; productivity attracts investment. The industrial ecosystem therefore resembles a chain in which the strength of one link conditions the strength of the whole. Investment in infrastructure can improve connectivity, lower production costs and reinforce value chains simultaneously. Investment in research can generate technologies that increase productivity and create new industrial activity. Investment in skills provides the human capital required to adopt, adapt and exploit those technologies.

The outputs are therefore interdependent rather than additive. Industrial capacity cannot expand sustainably without complementary finance, infrastructure, energy, technology and human capital. A factory without energy is capacity without production; technology without skills is innovation without adoption; infrastructure without industrial demand is connectivity without transformation. The KPI architecture consequently moves beyond counting projects towards assessing whether different forms of investment work together to generate productive capability.

These outputs generate the next stage: economic outcomes. The principal outcomes are increased investment, innovation, productivity, competitiveness, resilience and industrial capacity. Here, productivity becomes the crucial hinge between intervention and long-term economic performance. Investment creates capacity; capacity creates productivity; productivity creates competitiveness. Higher productivity enables firms to produce more efficiently, reduce costs and compete more effectively in European and global markets. Competitiveness can subsequently increase exports, investment and market share, creating a virtuous circle of industrial expansion.

Yet competitiveness alone is insufficient. What is the value of competitiveness without resilience? What is the value of efficiency if a supply-chain shock can bring production to a halt? What is the value of growth if its foundations remain strategically fragile? The framework therefore treats resilience not as an alternative to competitiveness but as its strategic complement. Stronger industrial capacity and diversified supply chains can reduce exposure to energy, geopolitical, technological and supply-chain shocks. Efficiency strengthens competitiveness; diversification strengthens resilience; together they strengthen industrial security.

The relationship between outcomes is consequently both sequential and reciprocal. Productivity attracts investment; investment finances innovation; innovation strengthens productivity. Competitiveness generates resources; resources finance innovation; innovation reinforces competitiveness. Resilience protects capacity; protected capacity sustains investment; sustained investment strengthens resilience. The causal chain thus becomes a causal circle: input becomes output, output becomes outcome, outcome becomes impact, and impact feeds back into future investment.

These mutually reinforcing relationships generate the broader impact of industrial policy. The principal impacts are higher potential GDP, stronger strategic autonomy, improved employment and greater sustainability. Potential GDP is particularly important because it captures an expansion of the economy's underlying productive capacity rather than a temporary increase in demand. The ultimate objective is therefore not simply to spend more, build more or produce more, but to raise the productive ceiling of the European economy.

The five headline KPIs—investment leverage, productivity, competitiveness, strategic resilience and GDP impact—therefore function as the principal indicators through which the causal architecture can be evaluated. Each captures a different stage of the transformation, but none is sufficient in isolation. Leverage without productivity is financial expansion without transformation; productivity without competitiveness is efficiency without market power; competitiveness without resilience is growth without security; resilience without productivity is protection without dynamism; GDP growth without sustainability is expansion without durability.

The architecture can therefore be expressed as a ring composition rather than a simple linear sequence:

EU budget allocation → investment mobilisation → industrial outputs → economic outcomes → strategic impacts → reinvestment and institutional reinforcement → renewed investment.

Or, in condensed form:

Input → Mobilisation → Output → Outcome → Impact → Feedback.

The metaphor is deliberate: the KPI system is not a ladder that ends at GDP, but a wheel of industrial transformation. Finance turns the wheel; investment gives it momentum; innovation and infrastructure give it direction;

productivity gives it speed; competitiveness carries it forward; resilience keeps it from breaking under pressure.

The ultimate logic is therefore both linear and circular, financial and productive, economic and strategic. The 5% allocation matters not because the number itself guarantees success, but because it can initiate a chain of additional investment, productive outputs, economic outcomes and strategic impacts. Spend, mobilise, produce, innovate, compete, endure, grow. The central proposition is thus simple: EU industrial expenditure becomes economically meaningful only when it generates additional productive capacity, and productive capacity becomes strategically meaningful only when it produces lasting competitiveness and resilience.

This logic also implies that the KPI framework must measure **complementarity between sectors**, rather than evaluating each industrial intervention in isolation. The relevant question is whether investment in one capability creates demand, productivity or investment opportunities in another. For example, investment in renewable energy should be assessed partly through its effects on electricity-intensive manufacturing, hydrogen, chemicals and industrial processing. Investment in semiconductors should be connected to its contribution to automotive, defence, telecommunications and advanced manufacturing value chains. Investment in digital infrastructure should be assessed through its effects on logistics, services, manufacturing productivity and technology adoption. This allows the framework to identify where **comparative advantages are compatible** and where clusters of mutually reinforcing industries are emerging. A sector becomes strategically important not only because of its own output, but because of the capabilities and markets it creates for other sectors. The KPI framework should therefore capture spillovers, domestic value added, supplier development, technology transfer and cross-sector investment. This provides a stronger test of whether public expenditure is generating an industrial ecosystem rather than a collection of disconnected projects. The ultimate KPI question is therefore not simply whether Europe has invested more, but whether each investment increases the productive potential and strategic value of investments elsewhere.

Investment leverage can be measured through private capital mobilised per euro of EU funding and the additionality of supported projects. Industrial capacity can be assessed through new production facilities, manufacturing value added and capacity utilisation. Productivity can be measured through labour productivity, total factor productivity and energy efficiency. Competitiveness can be captured through export growth, market share, unit costs and revealed comparative advantage. Industrial complementarity can be measured through domestic sourcing, supplier networks and cross-sector investment.

For example, energy investment should be linked to its effects on chemicals, metals, hydrogen and energy-intensive manufacturing. Critical-mineral investment should be assessed through its links to processing, batteries, electronics and advanced manufacturing. Resilience indicators should capture supplier diversification, import dependence and exposure to strategic external shocks. The overall framework should therefore test whether investment creates mutually reinforcing capabilities, allowing comparative advantages in different sectors to combine into a stronger and more resilient European industrial system.

If a stakeholder-based Industrial Governance Forum is put in place, it could deliberate on whether EU financing is generating additional investment, whether that investment is creating industrial capabilities, and whether those capabilities are translating into innovation, productivity, competitiveness and resilience. This role should be directly embedded in the scheme's KPI framework, so that stakeholder deliberation is connected to the measurement of progress rather than operating as a parallel consultation process**.** The KPI framework should therefore capture the successive stages of the causal chain, distinguishing between indicators of EU inputs, additional investment, industrial outputs, economic outcomes and broader impact. Stakeholders should use these indicators to assess whether progress at one stage is plausibly translating into progress at the next. In particular, the Forum should scrutinise indicators of additionality and leverage to determine whether EU support is generating investment beyond what would otherwise have occurred. It should then assess whether the resulting investment is reflected in measurable changes in industrial capacity, technological capability, skills and innovation. Subsequent KPIs should capture whether these capabilities translate into productivity, competitiveness and resilience improvements at firm, sectoral and European levels. The Forum should also use stakeholder evidence to interpret KPI movements, identify bottlenecks and explain divergences between expected and observed outcomes. The KPI framework should consequently serve not merely as a reporting instrument, but as the empirical backbone of the Forum's deliberation and course-correction function**.** This would ensure that the scheme's investment targets are assessed against their contribution to the wider industrial policy objectives, rather than treated as outcomes in themselves.

23.Should people, organisations and technology be brought under one DG Industry budget line?

The case for creating a single DG Industry budget line linking people, organisations and technology is strong, but only if it is designed as an integrated industrial-capability budget rather than simply a larger pot of money for industry. The central argument is that Europe's industrial problem is increasingly not a shortage of individual technologies, workers or firms, but a failure to connect technology, organisational capability and human capital into competitive production systems.

A technology does not create productivity by itself. AI requires skilled workers, suitable organisations, data, computing infrastructure, management capability and access to capital. A battery technology requires engineers, suppliers, factories, energy infrastructure, finance and trained workers. A semiconductor strategy requires researchers, equipment producers, specialised technicians, universities, customers and long-term investment. Industrial competitiveness is therefore the result of a system, not a technology alone.

This provides a strong argument for bringing the three dimensions together under one strategic DG Industry envelope. At present, industrial policy can become fragmented between technology policy, research policy, employment and skills policy, energy policy, regional policy and financial instruments. Each policy can be individually rational while the overall system remains poorly coordinated. A company may receive R&D support but be unable to scale; workers may receive training but have no expanding firms to employ them; firms may receive investment finance but lack the skills or technology necessary to become competitive.

A common **budget line could address this problem by financing the whole industrial transformation cycle**. It could support research and development at the beginning, demonstration and scale-up in the middle, investment in productive organisations and infrastructure during commercialisation, and skills and worker transition throughout the process.

The strongest **argument for such a model is therefore complementarity**. The return on one euro spent on technology can be much higher when another euro is simultaneously spent on skills and organisational transformation. Likewise, training has greater value when workers are entering growing, technologically advanced firms rather than being trained for declining industries.

There is also an important **European value-added argument.** Many industrial ecosystems cross national borders. A battery value chain can involve research in one Member State, materials from another, production in a third and customers across the Single Market. The same applies to aerospace, semiconductors, AI, pharmaceuticals and defence. A fragmented national approach can therefore underinvest in capabilities whose benefits are European rather than national.

A common DG Industry budget could consequently operate around industrial missions or capability chains, rather than traditional administrative categories. Instead of asking whether money belongs to research, employment, industry or digital policy, the EU could ask: *what is required to make European AI, batteries, biotechnology, advanced manufacturing or defence technology globally competitive?*

There is, however, a serious **counterargument.** Concentrating people, organisations and technology under one DG could create excessive bureaucratic power and weaken policy specialisation. Skills policy has objectives that go beyond industrial competitiveness. Research policy must protect scientific independence and basic research. Regional policy has cohesion objectives. Social policy has distributional objectives. If everything is placed under DG Industry, these broader purposes could become subordinate to competitiveness.

There is also a danger of **industrial-policy capture**. A very large DG Industry budget would become extremely attractive to major corporations and established industrial interests. The EU could gradually move from creating competitive markets to protecting incumbent firms. This would be precisely the opposite of a Schumpeterian approach based on creative destruction and innovation.

The answer is therefore not necessarily to put all spending on people, organisations and technology into DG Industry. A better model would be to create a common strategic industrial budget line, while retaining separate institutional responsibilities for education, research, cohesion and social policy.

The DG Industry budget would finance the industrial component of these policies: industrial R&D, scale-up, technology deployment, workforce skills directly connected to strategic industrial transformations, organisational upgrading, demonstration facilities, industrial infrastructure, supply chains and dual-use capabilities. Other DGs would retain responsibility for broader education, basic research, social policy and cohesion.

This creates a useful distinction between ownership of

policy and coordination of investment. DG Industry does not have to control every programme. It can provide the strategic framework within which different DGs coordinate their contributions.

The budget could therefore be organised around three interconnected pillars.

People would finance advanced technical skills, vocational transformation, engineering capacity, industrial apprenticeships, reskilling and mobility where these are directly linked to strategic industrial ecosystems.

Organisations would finance scale-up, management and production capabilities, industrial clusters, supplier networks, technology transfer, demonstration plants and investment that enables firms to move from innovation to mass production.

Technology would finance R&D, pilots, advanced infrastructure, AI, semiconductors, biotechnology, clean technologies, robotics, advanced materials, quantum technologies and defence-related R&D.

The critical principle would be that funding should follow the industrial transformation, not the administrative category.

For example, suppose Europe identifies advanced battery technology as strategically important. The budget should not finance battery research in one programme, worker training in another programme, industrial scale-up in a third and supply-chain development in a fourth without coordination. It should construct an integrated battery capability: research → engineers → pilot production → suppliers → skilled workers → factories → European demand → export competitiveness.

The same logic applies to AI. Funding basic AI research without computing infrastructure is insufficient. Computing infrastructure without skilled researchers is insufficient. Skilled researchers without commercial firms are insufficient. Firms without access to European customers and capital may scale elsewhere. The industrial ecosystem must therefore be considered as a whole.

This approach also changes how the EU should measure success. A conventional budget asks how much was spent and how many projects were funded. An integrated industrial budget should ask whether European productive capacity increased.

Its indicators could include productivity growth, private capital mobilised, new firms scaled, patents commercialised, export performance, skilled jobs created, worker wage growth, European supply-chain resilience, energy-cost reductions and citizen utility generated per euro.

The strongest argument for the model is therefore not administrative efficiency. It is that the unit of industrial policy should be the ecosystem rather than the programme.

The strongest argument against it is that the EU should not allow industrial competitiveness to absorb every other policy objective.

My conclusion would therefore be to establish a DG Industry-led strategic industrial investment line, but not a DG Industry monopoly over people, organisations and technology. It should have a sufficiently large common budget to coordinate the three, while preserving the autonomy and expertise of the DGs responsible for research, employment, education, cohesion and social policy.

In conceptual terms:

People provide the capabilities, organisations provide the productive system, and technology provides the means of transformation; European industrial policy should finance all three together because none can generate sustained competitiveness in isolation.

The objective should ultimately be not to create a bigger DG Industry, but to create a European industrial system capable of turning knowledge into technology, technology into productive organisations, productive organisations into good jobs, and those jobs into higher European living standards.

Insitutional density in budgetary terms often lead to a loss of strategic orientation, and to spread fencing instead of concentrated effort zooming in on delivery pertinent to a competitve industry policy and strategy. High institutional density can fragment public resources and dilute strategic focus. Rather than concentrating fiscal, institutional and managerial capacity on a limited number of industrial priorities with the potential to generate international competitiveness, governments may spread resources across a proliferation of programmes and institutions. The result is often a portfolio of individually defensible initiatives but insufficient scale, coordination and accountability to deliver structural transformation. A more effective industrial strategy therefore requires greater selectivity and concentration of effort, with institutional arrangements subordinated to clearly defined competitive priorities and measurable delivery outcomes.

The EU needs to avoid spreading scarce public resources across too many institutions, programmes and sectors.
Instead, industrial policy should concentrate resources on activities that can generate high domestic added value while strengthening Europe's position in global markets.
Key priorities include AI, advanced computing, semiconductors, photonics and digital infrastructure.
Europe should also prioritise clean energy, grids, storage and industrial decarbonisation to reduce costs and increase the competitiveness of European production.
Critical raw materials, processing, advanced materials and chemicals are important for retaining more value within Europe and reducing strategic dependencies.
Europe should build on its strengths in advanced manufacturing, machinery, robotics and industrial software to increase productivity and domestic value creation.
Defence, aerospace, space and cybersecurity can generate high-value technological capabilities with significant spillovers across the wider economy.
Biotechnology, pharmaceuticals and health technologies are similarly important for creating high-value production and maintaining strategic resilience.
The objective should not be to preserve every existing industry, but to develop capabilities and value chains in which Europe can capture a greater share of value domestically and compete successfully worldwide.
The central principle should therefore be concentrated investment, higher domestic value added and global competitiveness, with EU resources directed towards areas where European action can deliver transformational results.

The EU should take up the competitive challenge from China and the US where it can build globally competitive industries and retain a significant share of domestic value added. This means concentrating resources on areas such as AI and advanced computing, semiconductors and photonics, clean energy and grids, critical raw materials and advanced materials, robotics and advanced manufacturing, pharmaceuticals and biotechnology, and defence and space technologies. The objective should not be to compete with China and the US in every industry, but to identify specific value chains where Europe has strong capabilities, major markets and realistic opportunities to scale. Public support should therefore focus on closing critical gaps in technology, investment, skills, infrastructure and scale, enabling European firms to grow from research and innovation into globally competitive production. The test for industrial policy should ultimately be whether it raises productivity, increases domestic value added, reduces strategic dependencies and produces firms capable of winning global market share.

24. Leading EU Industrial Policy Transformation

Europe's industrial renewal stands at a decisive moment in its history. The continent faces a world defined by geopolitical rivalry, technological disruption, energy transition, and fierce competition for capital, talent, and innovation. The challenge is not merely to preserve Europe's industrial base but to reinvent it for a new era. Industrial policy has therefore re-emerged as a central instrument of economic strategy. Yet the European context makes industrial policy uniquely complex. Unlike a nation-state with a single government and a unified political mandate, the European Union operates through a system of shared sovereignty, multiple institutions, and diverse national interests. Managing industrial transformation within such a system requires far more than technical expertise. It demands strategic vision, disciplined execution, and political dexterity.

The first challenge is scale. Europe possesses world-class firms, leading research institutions, highly skilled workers, and deep capital markets. However, these strengths are often dispersed across national boundaries. Fragmentation limits the ability of European firms to achieve the scale enjoyed by competitors in the United States and China. Industrial policy must therefore seek to transform fragmentation into integration. This requires viewing European competitiveness as a collective project rather than a collection of national ambitions. Leaders must cultivate a mindset that places continental capability alongside national priorities. The objective is not the erosion of national interests but their alignment within a broader strategic framework.

Achieving scale begins with a clear understanding of strategic sectors. Not every industry can receive equal attention or support. Policymakers must identify those sectors that are critical to economic resilience, technological leadership, and strategic autonomy. Semiconductors, clean energy technologies, advanced manufacturing, artificial intelligence, defence industries, and critical raw materials are among the sectors that will shape Europe's future competitiveness. Once priorities are identified, resources must be concentrated rather than dispersed. Strategic focus is often politically difficult because every stakeholder wishes to be included. Effective leadership requires the courage to make choices. Without prioritisation, industrial policy becomes an exercise in dilution rather than transformation.

Scale also depends upon investment. European ambitions cannot be realised through public funding alone. Governments must create conditions that encourage

private capital to participate in industrial transformation. Public investment should act as a catalyst rather than a substitute. The European Investment Bank, national development banks, and private investors must operate within a coordinated ecosystem. Investors seek predictability, clarity, and long-term commitment. Therefore industrial strategies must be credible across political cycles. Frequent policy reversals undermine confidence and reduce investment. Stability becomes a competitive advantage in itself.

The Single Market remains one of Europe's greatest achievements, yet barriers persist. Regulatory fragmentation increases costs and slows growth. Businesses often encounter different administrative requirements across Member States. Such complexity reduces efficiency and discourages expansion. A renewed industrial strategy should therefore deepen market integration. Harmonisation should not be pursued for its own sake but because it enables firms to innovate, invest, and compete more effectively. The removal of unnecessary obstacles can generate gains equivalent to substantial financial subsidies. Sometimes the most powerful industrial policy is the elimination of bureaucratic friction.

Industrial renewal also requires strategic planning. Planning is not an exercise in predicting the future with certainty. Rather, it is the disciplined process of preparing for multiple futures. Effective planning begins with a clear vision. Leaders must define what success looks like and why it matters. Objectives should be ambitious enough to inspire action yet realistic enough to guide implementation. Vague aspirations generate confusion. Precise goals create alignment. Every major programme should be connected to measurable outcomes that can be evaluated over time.

Stakeholder analysis is an essential component of planning. Industrial policy affects governments, businesses, workers, consumers, investors, and communities. Each group possesses distinct interests, expectations, and concerns. Ignoring these perspectives can create resistance that undermines implementation. Effective planners identify stakeholders early and engage them continuously. Consultation is not merely a procedural requirement. It is a strategic activity that builds legitimacy and trust. Policies imposed without dialogue often encounter obstacles that could have been anticipated and addressed.

Risk management is equally important. Industrial transformation takes place in an environment characterised by uncertainty. Technologies evolve rapidly. Supply chains can be disrupted by geopolitical tensions. Economic conditions fluctuate unexpectedly. Regulatory frameworks change over time. Effective leaders recognise uncertainty rather than deny it. They establish mechanisms to identify risks, assess probabilities, and develop mitigation strategies. Resilience emerges not from avoiding risk but from preparing for it intelligently.

Once planning is complete, attention must shift to execution. Many strategies fail not because they are poorly conceived but because they are poorly implemented. Execution requires governance structures that clarify roles, responsibilities, and decision-making authority. Ambiguity creates delay. Clarity enables action. Programmes should have dedicated leadership teams with the authority and resources necessary to deliver results. Accountability should be explicit rather than assumed. When everyone is responsible, no one is responsible.

Monitoring is a critical discipline within project management. Progress must be measured continuously rather than retrospectively. Leaders require timely information about performance, costs, schedules, and outcomes. Data should illuminate reality rather than reinforce assumptions. Effective monitoring enables early detection of problems. Small issues can often be corrected quickly. Large problems frequently emerge when warning signs are ignored. Monitoring therefore serves as an early-warning system for strategic execution.

Performance indicators must be selected carefully. Too few indicators create blind spots. Too many indicators create confusion. The most useful measures capture progress toward strategic objectives. Economic performance, technological capability, environmental sustainability, workforce development, and investment levels all provide valuable insights. Indicators should inform decisions rather than satisfy reporting requirements. Measurement has value only when it influences action.

Control mechanisms are equally necessary. Control does not imply rigidity. In complex environments, excessive rigidity can be counterproductive. Instead, control involves maintaining alignment between objectives and activities. Leaders must regularly review performance and determine whether corrective action is necessary. Budgets may need adjustment. Timelines may require revision. Resources may need reallocation. Adaptation should be viewed as a sign of responsiveness rather than failure. The ability to learn and adjust is often the defining characteristic of successful programmes.

Industrial policy in Europe is ultimately shaped by politics. Politics is not an obstacle to policy. Politics is the environment within which policy operates. Understanding

power therefore becomes essential. Power within the European Union is distributed across institutions, governments, and stakeholder groups. The European Commission exercises influence through legislation, regulation, competition policy, and strategic initiatives. The European Parliament contributes democratic legitimacy and legislative authority. The Council represents Member States and reflects national priorities. Effective leaders understand the perspectives and incentives of each institution.

National governments remain central actors. Each Member State possesses its own economic structure, political culture, and industrial interests. Germany may prioritise manufacturing competitiveness. France may emphasise strategic sovereignty. Smaller Member States may focus on market access and fairness. These differences are not anomalies. They are inherent features of the European project. Successful leaders do not seek to eliminate differences. They seek to align them around shared objectives.

Coalition building is therefore a core leadership skill. Few industrial initiatives succeed through unilateral action. Progress typically emerges through alliances. Coalitions require trust, communication, and compromise. Leaders must identify common interests while respecting legitimate differences. They must articulate narratives that resonate across diverse audiences. A compelling vision can unite stakeholders who might otherwise remain divided. Narrative is therefore not a superficial element of policy. It is a strategic resource.

People matter as much as institutions. Industrial transformation is ultimately implemented by individuals. Civil servants, executives, engineers, researchers, workers, and political leaders all contribute to outcomes. Technical competence is essential, but human relationships often determine success. Trust accelerates cooperation. Distrust creates friction. Effective leaders invest time in relationship building because they recognise that influence depends upon credibility.

Communication plays a crucial role in managing people. Stakeholders need to understand not only what is being done but why it is being done. Communication should be transparent, consistent, and evidence based. Uncertainty should be acknowledged rather than concealed. Honest communication builds confidence even during difficult periods. Conversely, unrealistic promises can undermine legitimacy when expectations are not met.

Negotiation is another indispensable skill. Industrial policy frequently involves competing interests. Businesses may seek flexibility while regulators emphasise accountability. Environmental groups may prioritise sustainability while industries focus on competitiveness. Governments may disagree on funding allocations. Effective negotiation requires the ability to understand interests beneath stated positions. Solutions often emerge when underlying concerns are identified and addressed.

Conflict is inevitable in complex political systems. The objective is not to eliminate conflict but to manage it constructively. Productive conflict can generate innovation and improve decision making. Destructive conflict can paralyse action. Leaders must distinguish between disagreement that strengthens policy and disagreement that undermines progress. This requires judgement, patience, and emotional intelligence.

The politics of industrial policy are increasingly shaped by geopolitics. Strategic competition between major powers has transformed economic policy into a matter of national and regional security. Supply chains are now viewed through the lens of resilience as well as efficiency. Dependencies that once appeared benign may now be perceived as vulnerabilities. Europe must therefore balance openness with strategic caution. This balance requires nuanced decision making rather than simplistic solutions.

The green transition introduces another layer of complexity. Decarbonisation is both an environmental imperative and an industrial opportunity. However, the transition creates winners and losers. Some industries will expand while others will face significant adjustment pressures. Policymakers must manage these transitions carefully. Economic transformation that lacks social legitimacy is unlikely to endure. Just transition principles therefore become essential components of industrial strategy.

Skills and talent represent another critical dimension. Industrial competitiveness depends upon people capable of developing and applying advanced technologies. Educational systems, vocational training programmes, and lifelong learning initiatives must therefore be integrated into industrial policy. Talent shortages can become binding constraints on growth. Investment in human capital is therefore as important as investment in physical infrastructure.

Innovation remains at the heart of industrial renewal. Europe possesses exceptional research capabilities but often struggles to commercialise innovation at scale. Bridging the gap between invention and industrial deployment requires coordinated action. Universities,

research institutions, startups, established firms, and investors must operate within supportive ecosystems. Innovation flourishes when knowledge, capital, and entrepreneurial ambition intersect effectively.

Leadership in this environment requires humility as well as confidence. No individual or institution possesses complete knowledge. Complex systems generate outcomes that cannot always be predicted. Effective leaders remain open to learning. They seek evidence, welcome feedback, and adapt when circumstances change. Humility enhances resilience because it encourages continuous improvement.

At the same time, leadership requires conviction. Stakeholders are unlikely to follow leaders who lack clarity of purpose. Conviction provides direction during periods of uncertainty. It enables difficult decisions when consensus is elusive. The challenge lies in balancing confidence with openness. Strong leaders combine determination with curiosity.

The future of European industrial policy will depend on the ability to integrate economic, technological, environmental, and political objectives. These goals should not be viewed as mutually exclusive. Competitiveness and sustainability can reinforce one another. Innovation and inclusion can coexist. Strategic autonomy and openness can be balanced. Integration rather than trade-off should be the guiding principle.

Success will not be measured solely by economic indicators. It will also be measured by Europe's ability to maintain social cohesion, democratic legitimacy, and public trust. Industrial policy must deliver tangible benefits for citizens. People support transformation when they believe its rewards are shared fairly. Legitimacy therefore becomes a strategic asset.

Ultimately, managing the challenges of scale, planning and controlling projects, and navigating power, people, and politics requires a holistic approach. Technical excellence alone is insufficient. Political skill alone is insufficient. Success emerges from the combination of strategic vision, operational discipline, and human understanding. Europe's industrial renewal is not simply an economic programme. It is a collective endeavour that seeks to shape the continent's future in an increasingly competitive world. Those who lead this endeavour must think strategically, act pragmatically, and build coalitions capable of sustaining long-term transformation. The complexity of the task is undeniable. Yet complexity should not be mistaken for impossibility. With effective leadership, disciplined execution, and a shared sense of purpose, Europe can transform industrial renewal from a policy aspiration into a lasting achievement.

Figure



The logic of the argument follows a coherent progression from why Europe needs industrial renewal, to how it can be managed, and finally to how political realities determine success.

It begins by establishing the strategic context. Europe faces increasing pressure from geopolitical competition, technological disruption, energy security concerns, and the transition to a low-carbon economy. This opening is important because it explains why industrial policy has returned to the centre of European economic governance. Without first understanding the external pressures acting upon Europe, the case for industrial renewal lacks urgency and purpose.

The next logical step is the challenge of scale. Before discussing projects, governance, or politics, the analysis correctly identifies Europe's structural problem: fragmentation. European firms often compete within a large market that remains divided by regulatory, financial, and political barriers. The argument therefore moves from diagnosis to strategic necessity, explaining that competitiveness requires greater integration, larger industrial ecosystems, coordinated investment, and the development of continental rather than purely national capabilities. This establishes scale as the foundation upon which all subsequent actions depend.

Having identified the need for scale, the discussion naturally transitions into planning. Once strategic objectives have been defined, leaders must determine how they will be achieved. Planning provides the bridge between ambition and execution. The sequence here is sound because large-scale transformation cannot occur without clear goals, stakeholder analysis, risk assessment, resource allocation, and governance structures. Planning transforms political aspiration into a practical programme of action.

The argument then advances to monitoring and control. This follows established project-management logic. Planning alone does not guarantee success. Complex industrial programmes operate in uncertain environments and therefore require continuous oversight. Monitoring provides information about progress, while control mechanisms ensure that implementation remains aligned with strategic objectives. The progression from planning to monitoring reflects the classical management cycle of planning, implementation, measurement, and

corrective action.

Once the managerial dimension has been addressed, the analysis moves into the political dimension. This is a crucial transition because industrial policy in the European Union is not implemented within a hierarchical organisation but within a multi-level political system. The discussion correctly recognises that technical solutions are insufficient unless they can survive political negotiation and institutional complexity. The argument therefore broadens from management to governance.

The examination of power comes first within the political section because power determines who can influence outcomes. The European Commission, Parliament, Council, Member States, industries, and civil society organisations all possess varying degrees of authority and influence. Understanding this distribution of power is a prerequisite for effective action. Before one can manage stakeholders, one must understand where authority resides.

From power, the argument moves to people. This is a logical progression because institutions act through individuals. Policies are designed, negotiated, implemented, and evaluated by people operating within organisations. Trust, credibility, communication, and relationships therefore become central factors in policy success. The discussion correctly highlights that human factors often determine whether institutional arrangements function effectively.

The analysis then advances to politics. Once power structures and stakeholder relationships have been mapped, attention turns to negotiation, coalition building, conflict management, and compromise. Politics emerges as the arena in which competing interests are reconciled. This sequence reflects the reality of European policymaking, where agreements are rarely imposed and more often constructed through bargaining and consensus-building.

The incorporation of geopolitical considerations follows naturally from domestic politics. European industrial policy does not operate in isolation but within a global environment characterised by strategic competition. The logic here is that internal coordination must ultimately support Europe's external position. Competitiveness, resilience, and strategic autonomy are therefore linked to broader geopolitical objectives.

The discussion then broadens further to include the green transition, innovation, and skills. These themes represent the substantive content of industrial renewal. After explaining how industrial policy should be governed and managed, the argument identifies the capabilities required for long-term success. Innovation provides technological leadership, skills provide human capacity, and sustainability provides social and environmental legitimacy.

The concluding framework integrates all previous elements into a coherent model. Scale addresses competitiveness. Planning provides direction. Monitoring ensures discipline. Governance establishes accountability. Influence enables coalition building. Delivery produces outcomes. The sequence is effective because each stage builds upon the preceding one. None of the later stages can function effectively without the foundations established earlier.

Viewed as a whole, the argument follows a classic strategic-management structure. It moves from environmental analysis to strategic challenge, from challenge to planning, from planning to implementation, from implementation to governance, and from governance to political leadership. This progression mirrors the way major industrial transformations are actually conducted in practice.

The central insight emerging from this logical sequence is that European industrial renewal is not primarily a question of economics, technology, or regulation alone. It is the cumulative outcome of strategic scaling, effective programme management, institutional coordination, stakeholder engagement, and political leadership. The sequence demonstrates that success depends on the interaction of all these elements rather than on any single intervention. Consequently, the argument's strongest feature is its recognition that industrial policy is both a managerial and a political project, requiring competence in execution and skill in coalition building if Europe is to achieve lasting industrial renewal.

Ultimately, the challenges of scale, coordination, and political mobilisation identified in the preceding chapter reveal a deeper constitutional question. The effectiveness of any industrial strategy is determined not only by the quality of its objectives or the competence of its execution, but by the legal and institutional foundations upon which it rests. As the European Union seeks to reconcile economic competitiveness, strategic autonomy, and democratic legitimacy, attention must turn to the constitutional framework that structures and constrains collective action. The next chapter therefore examines the constitutional provisions necessary to support a renewed European industrial policy capable of meeting the demands of an increasingly competitive and fragmented global order.

25. Industrial Competition Between Tomorrow's Great Powers: The EU Industrial Policy Response

Industrial competition is likely to become one of the central dimensions of great-power rivalry in the twenty-first century. The competition between major powers will not be confined to conventional military capabilities or territorial influence, but will increasingly concern technological leadership, productive capacity, critical infrastructure, energy systems, supply chains, financial networks, and access to strategically important resources. The central challenge for international order is therefore not to eliminate industrial competition, which would be neither feasible nor necessarily desirable, but to prevent economic and technological rivalry from becoming so deeply securitized that commercial competition generates security dilemmas, coercive spirals, and ultimately military confrontation.

The fundamental danger lies in the interaction between industrial dependence and national security. Globalization has produced highly interconnected economies in which states frequently depend upon foreign suppliers, technologies, markets, infrastructure, and financial systems. Such interdependence can create incentives for peace because war becomes economically costly. Yet the same interdependence can also become a source of vulnerability. When governments begin to view economic dependence as a potential instrument of coercion, industrial policy becomes increasingly oriented toward resilience, autonomy, and strategic control. Measures initially justified as defensive can then be interpreted by competitors as preparations for economic containment or even military confrontation. The resulting dynamic resembles a conventional security dilemma, except that the instruments are tariffs, export controls, subsidies, investment restrictions, technology denial, sanctions, and supply-chain diversification rather than tanks and missiles.

The central objective of policy should therefore be to distinguish legitimate economic competition from forms of industrial rivalry that pose systemic risks to international security. States should retain considerable freedom to compete over productivity, innovation, market share, employment, investment, and technological development. At the same time, governments should recognize that certain industries possess consequences extending far beyond ordinary commercial competition. Where industrial capabilities are directly connected to military power, critical infrastructure, or the functioning of national economies, competition requires additional transparency and diplomatic management.

Semiconductors are perhaps the clearest example. Advanced chips are simultaneously commercial products, foundations of artificial intelligence, components of military systems, and essential inputs into modern economies. Restrictions on advanced semiconductor technology can therefore have legitimate national-security purposes, but they can also generate powerful incentives for retaliation and accelerated technological separation. The strategic challenge is to establish a credible distinction between technologies whose transfer creates genuine military risks and technologies whose restriction primarily serves broader commercial or geopolitical objectives. Without such a distinction, the category of national security can expand indefinitely until virtually every technologically important industry becomes subject to strategic controls.

Artificial intelligence presents an even more difficult problem because the technology is developing rapidly and has applications across both civilian and military domains. AI can influence intelligence collection, cyber operations, logistics, autonomous systems, military planning, surveillance, and economic productivity. The critical diplomatic question is consequently not simply which state will achieve technological superiority, but which applications should be subject to common constraints irrespective of which state develops them first. The international community has considerable experience with this principle in other technological domains. The objective should be to establish forms of technological restraint around particularly destabilizing military applications while permitting extensive competition in less sensitive civilian applications.

Energy is another sector in which industrial and geopolitical competition are closely intertwined. The strategic importance of energy extends beyond conventional oil and gas to electricity grids, nuclear technology, batteries, energy storage, hydrogen, and other emerging technologies. Because modern economies cannot function without reliable energy supplies, attempts to manipulate energy dependence can rapidly acquire geopolitical significance. Diplomatic efforts should therefore seek to preserve diversified supply structures and discourage the deliberate transformation of essential energy infrastructure into instruments of political coercion.

Critical minerals present a related challenge. Lithium, cobalt, nickel, graphite, rare earth elements, and other materials are becoming increasingly important for advanced manufacturing, electrification, batteries, and defense industries. Yet the strategic vulnerability does not necessarily arise from geological scarcity alone. In many cases, the more important issue is concentration in mining, refining, processing, or manufacturing. The appropriate

response should therefore emphasize diversification rather than autarky. States can reduce vulnerability by developing multiple suppliers, maintaining strategic reserves, investing in recycling, and expanding domestic processing capacity without attempting to eliminate all economic interdependence.

Shipbuilding deserves particular attention because it demonstrates how civilian industrial capacity can directly influence military power. A country with extensive commercial shipbuilding capabilities possesses not merely an economic advantage but also an industrial base that can support naval expansion. If commercial shipbuilding competition becomes incorporated into strategic rivalry, industrial policy can begin to feed directly into naval competition, which in turn can generate greater maritime insecurity. Transparency concerning industrial capacity, naval procurement, and dual-use capabilities may therefore become increasingly important as maritime competition intensifies.

Telecommunications, undersea cables, satellites, cloud infrastructure, and other digital systems represent another emerging category of strategic infrastructure. These systems are simultaneously commercial networks and essential components of modern national security. Their vulnerability creates the possibility of coercion and disruption below the threshold of conventional warfare. International agreements should therefore seek to establish clearer norms concerning attacks on critical civilian infrastructure, while maintaining communication channels capable of distinguishing accidental disruption, criminal activity, cyber operations, and deliberate state action.

The underlying principle should be the preservation of a meaningful distinction between competition and conflict. Not every industrial advantage held by a rival constitutes a security threat, and not every economic vulnerability requires elimination. Excessive attempts at economic self-sufficiency can paradoxically increase international instability by removing the reciprocal dependence that makes conflict costly. The objective should instead be resilient interdependence: sufficient diversification to prevent catastrophic vulnerability, combined with sufficient economic integration to preserve incentives for cooperation.

This requires a more deliberate form of economic diplomacy among the major powers. Rather than attempting to negotiate a comprehensive settlement of industrial competition, governments could establish permanent mechanisms for managing competition in strategically sensitive sectors. A standing dialogue among the principal industrial and technological powers could provide advance notification of major export controls, consultation before restrictions on critical commodities, emergency communication during supply disruptions, and regular discussion of technologies with significant military implications. Such a mechanism would not require governments to abandon national-security policies or ideological differences. Its purpose would be to make strategic competition more predictable.

The importance of predictability should not be underestimated. International crises frequently become dangerous not because governments initially desire war, but because each side misinterprets the intentions of the other. An export restriction intended as a limited defensive measure can be interpreted as an attempt at economic strangulation. A subsidy designed to protect domestic employment can be interpreted as an effort to destroy a foreign industry. Investment restrictions can be interpreted as preparations for technological warfare. Retaliatory measures then reinforce the original fears of both sides. Institutionalized consultation can interrupt this cycle by providing governments with opportunities to explain intentions, communicate red lines, and negotiate temporary compromises before economic disputes become strategic crises.

The same logic applies to military diplomacy. Industrial competition increasingly affects military balances, while military developments can intensify economic competition. Consequently, economic and security dialogues should not operate entirely separately. Strategic stability requires communication among economic policymakers, trade officials, technology regulators, defense establishments, and diplomats. In a crisis, governments need to know not only what the opposing military intends to do but also whether an apparently economic measure represents the beginning of a broader coercive strategy.

A useful framework would distinguish between areas of ordinary competition, areas requiring managed competition, and areas requiring strategic restraint. Ordinary competition should include most commercial activity, technological innovation, market competition, and industrial policy. Managed competition should encompass dual-use technologies, strategically concentrated supply chains, and industries whose disruption could create significant national-security consequences. Strategic restraint should apply to activities capable of directly threatening military command systems, nuclear deterrence, critical civilian infrastructure, or other capabilities where miscalculation could generate rapid and irreversible escalation.

Such differentiation is essential because treating every

strategically important industry as a security domain would ultimately undermine the purpose of strategic restraint. If everything becomes securitized, governments lose the ability to distinguish between genuine threats and ordinary geopolitical rivalry. The result is a permanent state of economic mobilization in which defensive measures are increasingly indistinguishable from preparations for confrontation.

The historical experience of the Cold War provides an important precedent. The United States and Soviet Union remained ideological and geopolitical adversaries, yet they gradually developed mechanisms intended to reduce the possibility that rivalry would produce catastrophic escalation. Arms-control agreements, military hotlines, confidence-building measures, diplomatic negotiations, and communication during crises did not eliminate competition. Instead, they established boundaries within which competition could occur without automatically producing war. A comparable logic may be required for the emerging era of technological and industrial rivalry.

The challenge for future great-power diplomacy is therefore not to construct a world without competition. Such a goal would be unrealistic. The more important task is to construct institutions capable of making intense competition compatible with strategic stability. Great powers do not need to trust one another completely in order to recognize that uncontrolled escalation is mutually destructive. They need mechanisms through which rivalry can be communicated, bounded, and periodically renegotiated.

The emerging international order should consequently treat industrial policy as part of the architecture of peace rather than merely as an instrument of national economic strategy. Governments will continue to pursue technological advantage, secure supply chains, protect domestic industries, and reduce vulnerabilities. The question is whether these policies are pursued within a framework of managed rivalry or whether they become components of an open-ended struggle for economic and technological supremacy.

The most important objective should be to ensure that industrial competition never becomes synonymous with existential competition. States should be able to lose a market without believing that they have lost their security; to experience technological setbacks without concluding that military confrontation is inevitable; and to impose limited economic restrictions without creating incentives for comprehensive economic warfare. If future great powers can preserve these distinctions, industrial rivalry may remain a source of innovation and prosperity rather than becoming a pathway to war.

The strategic principle is therefore simple but demanding: great powers must learn to compete deliberately. They should diversify without completely decoupling, protect sensitive technologies without treating all technology as a weapon, develop industrial resilience without pursuing absolute autarky, and defend national interests while maintaining institutionalized channels through which competitors can communicate. The central task of twenty-first-century diplomacy will be to construct the political and economic guardrails that allow major powers to compete intensely while ensuring that competition does not become irreversible conflict.

Table



The deeper principle connecting these strategies is that good diplomacy manages the interaction between capability, perception, and fear. Industrial power becomes dangerous when one state interprets another's effort to become resilient as preparation for coercion, while the second state interprets the first state's response as proof that greater resilience is necessary. This produces a self-reinforcing cycle of insecurity.

A wise strategy therefore seeks to break that cycle at several points simultaneously. States should retain the ability to protect genuinely sensitive technologies and supply chains, but they should communicate the scope and purpose of those measures. They should diversify dependencies, but avoid transforming diversification into comprehensive decoupling. They should impose costs on coercive behavior, but preserve channels through which the other side can negotiate relief. And, critically, they should distinguish between measures designed to increase national resilience and measures designed to make another great power economically incapable of competing.

For future great-power diplomacy, the most important institutional principle may therefore be the creation of permanent mechanisms for managed rivalry. The goal would not be a grand bargain in which the major powers agree on the distribution of global power. That is unlikely to be achievable. The more realistic objective is a diplomatic architecture in which disagreement is expected, competition is institutionalized, escalation is constrained, and crises have multiple off-ramps.

The ultimate measure of successful diplomacy would consequently not be whether one great power "wins" the industrial competition. It would be whether the major powers can experience relative gains and losses, impose limited economic restrictions, compete over technology, and pursue divergent geopolitical interests without interpreting every setback as an existential threat. That is the condition under which industrial competition can remain compatible with international peace.

The prevention of great-power war will depend less upon the abolition of rivalry than upon the cultivation of disciplines by which rivalry can be conducted without becoming catastrophic. In an era in which industrial capacity, technological superiority, financial power, energy security, and control over critical supply chains increasingly form part of national power, diplomacy must

extend its field of vision beyond armies and arsenals. The central problem is no longer merely how to deter an attack, but how to prevent the cumulative interaction of economic measures, technological restrictions, military preparations, and political suspicion from producing a crisis in which neither side can easily retreat.

The following principles constitute a vademecum for such a diplomacy. They are not rules of pacifism, nor are they prescriptions for unilateral accommodation. They are principles of disciplined statecraft: an attempt to reconcile firmness with prudence, deterrence with restraint, and national advantage with the preservation of an international order in which rival powers can continue to coexist.

Strategic restraint: capability is not obligation

The first duty of a great power is to distinguish between what it can do and what it ought to do. Modern states possess an extraordinary range of economic instruments: export controls, investment restrictions, financial sanctions, tariffs, subsidies, licensing requirements, technology denial, restrictions on capital flows, and measures capable of disrupting entire supply chains. The possession of such instruments inevitably creates a temptation to employ them whenever an adversary behaves contrary to one's preferences.

Yet the accumulation of instruments of coercion does not constitute a strategy. A state that treats every available capability as an instrument to be deployed risks converting limited disputes into permanent strategic confrontation. Restraint does not mean weakness. Properly understood, restraint is the disciplined preservation of power for circumstances in which its employment is genuinely necessary.

The statesman must therefore ask not merely, “Can we impose a cost?” but, “What will follow when the other side answers?” The first question concerns capability. The second concerns strategy. The difference between the two may determine whether competition remains peaceful.

Proportionality: do not use a sledgehammer against a needle

Economic and technological measures should bear some proportion to the threat they are intended to address. A narrowly defined military-security concern should not automatically produce restrictions upon an entire commercial relationship. When the instrument greatly exceeds the underlying problem, the target is given an incentive to retaliate across unrelated domains, while domestic constituencies on both sides acquire an interest in preserving escalation.

Proportionality is therefore not merely an ethical principle. It is an instrument of strategic control. A limited objective should normally invite a limited measure. If the security concern concerns one class of advanced technology, the restriction should, wherever feasible, remain confined to that class. If the concern is supply vulnerability, diversification may be preferable to embargo. If the concern is military use, end-use controls may be preferable to comprehensive commercial separation.

The wise government seeks to solve the problem before it enlarges the problem.

Reversibility: leave the other side an exit

A diplomatic measure is safer when it can be withdrawn without requiring the other government to accept public humiliation. Irreversible measures are dangerous because they transform temporary disagreements into permanent facts. Once an industry has been destroyed, a supply relationship severed, a treaty abandoned, or a political commitment publicly repudiated, returning to the previous equilibrium becomes difficult.

The statesman should therefore preserve avenues of retreat. Temporary restrictions, review procedures, conditional exemptions, phased implementation, and sunset provisions can all serve this purpose. They create the possibility that a government may alter course without appearing to capitulate.

This is particularly important in relations among major powers, where domestic prestige and political legitimacy may be nearly as important as material interests. Diplomacy should never corner an adversary unnecessarily. A cornered power is not necessarily a defeated power; it may instead become a desperate one.

Transparency: ambiguity multiplies threat perceptions

Strategic ambiguity has its uses, but unexplained economic and technological measures can generate precisely the insecurity they are intended to prevent. If one state introduces export controls, industrial subsidies, or investment restrictions without communicating their purpose, the other state is likely to infer the broadest possible intention. Defensive measures may therefore be interpreted as preparations for economic strangulation.

Transparency does not require the disclosure of sensitive

intelligence or military secrets. It requires the communication of political purpose. Governments should explain what a restriction is intended to prevent, what it does not seek to prevent, and under what conditions it might be revised.

The purpose is not to make policy predictable in every detail. It is to prevent uncertainty from becoming an invitation to worst-case reasoning.

Reciprocity: trade restraint for restraint

Stable relations between rival powers cannot be built upon permanent unilateral concessions. Yet reciprocity should not be confused with retaliation. The former seeks equilibrium; the latter often seeks punishment.

A more prudent diplomacy links restraint to restraint. One government limits a category of export controls in exchange for reciprocal transparency. One side permits certain commercial exchanges in return for safeguards concerning military applications. One government postpones an escalation while the other investigates an incident.

Such arrangements create a political logic in which moderation generates moderation. They provide governments with reasons to exercise restraint even when relations remain deeply distrustful.

Differentiation: not every competitor is an enemy

Perhaps the most important intellectual discipline is the ability to distinguish commercial competition from strategic hostility. A foreign company gaining market share is not necessarily a national-security threat. A rival state developing an industrial capability is not automatically preparing for war. A trade deficit is not itself evidence of strategic defeat.

When every economic competitor is conceptualized as an adversary, normal competition becomes securitized. Once securitization occurs, ordinary economic losses acquire the character of national humiliation, and industrial policy becomes increasingly difficult to separate from military strategy.

The wise statesman must therefore preserve categories. Some things are matters of commerce; some are matters of economic security; some are matters of military security; and a small number are matters of existential security. If every question is placed in the final category, strategic judgment has ceased to operate.

Diversification: resilience, not autarky

The experience of recent decades demonstrates the dangers of excessive dependence upon a single supplier, processing center, technological platform, or transportation route. Yet the remedy for vulnerability is not necessarily economic isolation. Complete autarky is itself a form of vulnerability: it sacrifices efficiency, raises costs, reduces innovation, and deprives states of the stabilizing interests created by interdependence.

The more prudent objective is diversified interdependence. Governments should cultivate alternative suppliers, strategic reserves, domestic capabilities in genuinely critical areas, recycling and substitution technologies, and redundant infrastructure. But they should resist the seductive proposition that security requires independence from everyone.

A resilient state is not one that needs nobody. It is one that cannot easily be brought to its knees by the action of any single actor.

De-escalation: every escalation needs an off-ramp

Once retaliation begins, political logic can become remarkably powerful. Each measure is presented as a response to the previous measure. Each government insists that it did not initiate the escalation. Soon both sides are climbing a ladder whose upper reaches neither originally intended to occupy.

The purpose of de-escalatory diplomacy is to interrupt this sequence before it becomes self-sustaining. Governments should maintain graduated options between acquiescence and maximum coercion. They should be able to pause implementation, narrow restrictions, suspend retaliation, establish temporary exemptions, or convene emergency negotiations.

Every crisis should contain an off-ramp before it begins.

Compartmentalization: disagree in one arena, cooperate in another

Great-power relations will almost certainly contain simultaneous conflict and cooperation. Two states may disagree over territorial questions while cooperating on climate change; compete over semiconductors while maintaining financial communication; or confront one another diplomatically while continuing humanitarian and scientific exchanges.

This is not hypocrisy. It is strategic compartmentalization.

The alternative is to allow every disagreement to contaminate the entire relationship. Once this occurs,

every institution becomes an instrument of rivalry and every remaining area of cooperation becomes politically suspect. The relationship then loses its stabilizing ballast.

The wiser approach is to preserve as many bridges as possible. A dispute in one domain should not automatically become a rupture in every domain.

Issue linkage: build trust where trust is cheapest

Not every negotiation should begin with the hardest question. Great powers may be unable to agree upon territorial disputes or technological supremacy while still possessing substantial common interests in disaster response, maritime safety, public health, financial stability, climate, nuclear security, or the protection of civilian infrastructure.

These less contentious areas can serve as diplomatic ballast. Cooperation need not imply political trust; repeated successful cooperation can itself generate a degree of predictability.

Diplomacy should therefore seek areas in which reciprocal concessions are inexpensive and observable. Trust need not precede cooperation. In many cases, limited cooperation is what makes greater trust possible.

Face-saving: diplomacy requires exits, not victories

A government that is publicly humiliated will often find it politically impossible to compromise. This is especially true of great powers whose leaders must demonstrate that they have defended national sovereignty and prestige.

The objective of diplomacy is consequently not to deny the adversary every victory. It is to create an agreement that both governments can explain as consistent with their interests.

This is not weakness or deception. It is an appreciation of the domestic foundations of foreign policy. A settlement that is technically sound but politically impossible to defend will not survive. Statesmen must therefore distinguish between substantive concessions and symbolic gestures that permit the other side to retreat without surrendering its dignity.

Signaling: clarity prevents accidental escalation

Deterrence requires communication. A red line that is never communicated is not a red line; it is merely a private preference. Conversely, a red line attached to every conceivable interest becomes meaningless.

Strategic signaling should therefore communicate three things: what matters, why it matters, and what response would follow if it were violated. The purpose is not to threaten constantly but to reduce uncertainty.

Clarity is particularly important when economic and military instruments interact. If an export restriction is intended to protect a specific military capability rather than cripple an entire national industry, that distinction should be communicated. If a military deployment is defensive rather than preparatory to offensive action, the relevant channels should make that interpretation credible.

Crisis communication: talk most when talking is hardest

The value of diplomatic communication rises precisely when political relations deteriorate. Yet crises also create the strongest domestic pressures against communication. Leaders fear that contact will appear conciliatory, that negotiations will be exploited, or that speaking to an adversary will be interpreted as weakness.

The opposite is generally wiser. During periods of acute tension, direct communication becomes more valuable, not less. Military hotlines, leader-level communication, economic crisis channels, and emergency diplomatic consultations should remain operational even when ordinary relations are severely damaged.

The purpose of communication is not necessarily agreement. It is to prevent ignorance from becoming policy.

Strategic patience: do not make permanent decisions under temporary pressure

Great-power competition unfolds over decades. Political systems, technologies, demographic structures, and industrial capabilities change over time. A temporary advantage or setback should therefore not automatically be interpreted as a permanent alteration of the international order.

Strategic patience is particularly important in periods of technological transformation. Governments confronted with a rival's rapid progress may be tempted to conclude that the strategic balance is about to become irreversibly unfavorable. Such judgments can encourage premature and unnecessarily aggressive action.

The wise statesman distinguishes between a crisis that demands immediate action and a trend that demands sustained adaptation. Not every unfavorable development requires an immediate confrontation.

Institutionalization: do not rely on personal goodwill alone

Diplomatic stability should never depend exclusively upon the personalities of individual leaders. Personal relationships can be valuable, but political leadership changes, domestic politics shift, and crises occur at precisely the moments when personal trust may be least available.

The durable solution is institutionalization. Permanent working groups, strategic dialogues, military hotlines, economic consultation mechanisms, incident-reporting procedures, and regular meetings between officials create habits of communication that survive changes in government.

The greatest diplomatic achievement may sometimes be an institution so unremarkable that its success is noticed only when one realizes that a crisis did not occur.

Reciprocity with delay: give diplomacy time to work

The impulse to respond immediately to every hostile measure is understandable but strategically dangerous. Rapid retaliation can produce an escalatory sequence before either side has had time to determine what the other actually intended.

A prudent diplomacy therefore builds temporal space into reciprocal arrangements. Governments can announce that they will review a measure after a defined period, suspend further escalation pending consultation, or provide an opportunity for the other side to respond before additional restrictions take effect.

Time is not always the enemy of diplomacy. In crises, time can be one of its most valuable instruments.

Escalation dominance: keep intermediate options available

A government should possess credible means of responding to coercion without immediately resorting to its most severe instruments. This creates what might be called a ladder of response: diplomatic protest, consultation, targeted restriction, proportional retaliation, broader measures, and only at the far end the most severe forms of coercion.

The danger arises when governments possess only two choices: do nothing or escalate maximally. Such a binary structure makes crisis management extraordinarily difficult.

Strategic flexibility requires intermediate options. A government should be able to demonstrate resolve without making war—or economic war—the only remaining means of demonstrating it.

Civilian protection: competition should not become collective punishment

Even severe geopolitical rivalry should preserve a distinction between strategic pressure and indiscriminate harm to civilian populations. Food, medicine, essential communications, civilian energy infrastructure, humanitarian trade, and other basic necessities should receive particular protection.

This principle is strategically important as well as morally important. Economic warfare that creates widespread civilian suffering can produce political pressures that make compromise harder and retaliation more likely.

The objective of economic statecraft should therefore be to influence governments and strategic capabilities while minimizing unnecessary damage to societies.

Joint fact-finding: investigate before retaliating

Some of the most dangerous international crises begin with uncertainty. A ship is damaged. A communications network fails. A cyber system is penetrated. A satellite behaves unexpectedly. An industrial facility is disrupted. Evidence may initially be incomplete, while political pressure for immediate attribution is intense.

The prudent response is to establish mechanisms for joint or parallel investigation. Attribution should be treated as an analytical problem before it becomes a political verdict.

This principle is especially important in the cyber and space domains, where technical ambiguity can be considerable. A state that retaliates before establishing responsibility risks punishing the wrong actor and creating an entirely new crisis.

Sunset clauses: exceptional measures should expire unless justified

Measures introduced during periods of acute strategic tension should not automatically become permanent features of international economic relations. Once extraordinary restrictions become institutionalized, domestic interests often emerge that benefit from their continuation.

Sunset clauses provide a mechanism for periodic reconsideration. An export restriction, investment prohibition, or emergency trade measure should ideally contain provisions for review and renewal. The burden

should lie upon governments to demonstrate why an exceptional measure remains necessary.

This creates a distinction between temporary emergency policy and permanent strategic doctrine.

Red-line discipline: a red line loses meaning when everything is red

States must identify genuinely vital interests and resist the temptation to declare every issue a matter of national survival. The credibility of deterrence depends upon selectivity.

A government that threatens severe consequences over every dispute eventually confronts a dilemma: either act upon threats that were never genuinely vital or retreat and thereby weaken the credibility of future warnings.

Strategic clarity therefore requires hierarchy. Some interests are important. Some are highly important. A very small number are existential. Diplomacy must know the difference.

Strategic empathy: ask what your deterrence looks like from the other side

Perhaps the most difficult discipline in international politics is to imagine how one's own actions appear to an adversary. Governments naturally interpret their own military deployments, industrial policies, alliances, and technological restrictions according to their stated intentions. They often interpret the same actions by competitors according to their worst fears.

Strategic empathy does not require sympathy. One need not accept the adversary's interpretation as correct. One must nevertheless understand it.

If a state believes that it is strengthening its defenses while its adversary believes that it is preparing for domination, the strategic reality is determined not only by the first state's intentions but by the interaction between both perceptions. Diplomacy must therefore ask continually: if we were sitting on the other side of the table, what would this policy look like to us?

Coalition discipline: alliance solidarity should reduce escalation, not multiply it

Great powers rarely act alone. Alliances and partnerships can strengthen deterrence, but they can also create mechanisms through which bilateral disputes become multilateral confrontations.

Alliance management therefore requires discipline. Partners should be consulted before major escalatory measures are undertaken, and governments should distinguish between maintaining solidarity and automatically supporting every instrument of confrontation.

A mature alliance does not merely promise to stand together. It also provides mechanisms through which members can counsel restraint.

Competitive coexistence: stability does not require friendship

The final principle is perhaps the most important. Great powers need not trust one another completely. They need not share political systems, economic models, strategic preferences, or visions of world order. They may compete fiercely for technological leadership, influence, markets, alliances, and prestige.

What they must avoid is the conclusion that coexistence itself is impossible.

The central achievement of diplomacy is therefore not the conversion of rivals into friends. It is the creation of conditions under which rivals can remain rivals without becoming enemies at war.

The great lesson of strategic history is that peace does not depend upon the absence of conflict. International politics will always contain conflicting interests, ambitions, fears, and grievances. Peace depends upon whether states possess the wisdom and institutions necessary to prevent these conflicts from becoming cumulative and irreversible.

For the coming era of industrial and technological rivalry, this means constructing a system of managed competition. Great powers should diversify their dependencies without pursuing absolute autarky; protect sensitive technologies without declaring all technology a weapon; strengthen industrial resilience without treating another state's prosperity as an existential threat; and maintain deterrence without transforming every disagreement into a test of national survival.

The statesman of the coming age will therefore require a peculiar combination of qualities: firmness without recklessness, strength without vanity, patience without passivity, and imagination without illusion. The purpose of diplomacy is not to persuade rival powers that they have no conflicting interests. It is to persuade them that those interests can be pursued without destroying the conditions under which all sides can continue to prosper.

The highest form of strategic prudence is consequently not the avoidance of competition, but the mastery of competition. The enduring task is to ensure that nations may struggle for advantage without making war the final arbiter of their disputes; that they may prepare for the worst without assuming the worst; and that, even in an age of formidable rivalry, statesmen retain the courage to leave their adversaries a road back from the brink.

Geography of Indirect Conflict Material is global

Geoeconomic competition can be understood as the use of economic instruments to pursue geopolitical and strategic objectives. In this context, indirect conflict extends beyond military confrontation to include trade restrictions, sanctions, investment, infrastructure, technology, energy, and control over strategic resources. Great powers increasingly compete by shaping the economic choices and dependencies of other states rather than confronting each other directly. From a **realist perspective**, geoeconomic competition reflects the struggle for power, influence, security, and strategic advantage in an international system without a central authority. The concept of economic statecraft helps explain how states use economic incentives and coercive measures to influence the behaviour of other countries. Similarly, **dependency and interdependence theories** highlight how trade, finance, supply chains, and access to critical technologies can create both opportunities for cooperation and instruments of coercion. Empirically, the Indo-Pacific, Middle East, Africa, Latin America, and Eastern Europe have become important arenas of contemporary geoeconomic competition. China's Belt and Road Initiative, U.S. technology restrictions, Western sanctions on Russia, and competition over critical minerals illustrate these dynamics. Such competition often involves third countries and regional actors, making it an indirect form of great-power rivalry. Therefore, examining geoeconomic competition through the lens of indirect conflict helps explain how great powers seek to reshape regional orders without resorting to direct military confrontation.

Against this broader backdrop of geoeconomic competition, the industrial sector has unfortunately increasingly emerged as a critical arena in which great powers pursue strategic interests indirectly, through competition over markets, supply chains, technology, investment, and control of critical industries. Building on the sector framework, a handful of regions concentrate most of the risk — they're where the "yellow" and "red" zones actually get tested in practice, because they combine critical industrial capacity with contested geopolitics.

1. Taiwan and the Taiwan Strait

The single highest-stakes node. TSMC alone produces the overwhelming majority of the world's most advanced logic chips. This isn't just an AI/semiconductor supply chain risk — it's the place where "economic competition" and "military confrontation" are least separable, since a blockade or conflict scenario would be simultaneously a security crisis and an instant global chip shortage. This is arguably the strongest case for a dedicated hotline and crisis-communication mechanism, separate from the broader semiconductor dialogue.

2. South China Sea / Southeast Asia

Two overlapping dynamics: territorial disputes and shipping lanes (roughly a third of global trade transits here), plus the "China+1" manufacturing diversification wave (Vietnam, Malaysia, Indonesia, Philippines) that's reshaping electronics and battery supply chains. Freedom of navigation, undersea cables, and reshored manufacturing all sit in the same waters.

3. The Gulf / Middle East

Energy remains the obvious lever, but the region has also become a swing player in AI infrastructure (Gulf states buying chips, building data centers) and is a chokepoint for shipping (Strait of Hormuz, Red Sea/Suez). It's less a site of great-power territorial conflict and more one where the US, China, and Gulf states are all hedging simultaneously — making it a natural place for transparency mechanisms rather than crisis ones.

4. Sub-Saharan Africa (DRC, Zambia, Guinea, Niger, Zimbabwe)

Cobalt, lithium, copper, uranium, rare earths. This is the critical-minerals sector's ground truth — where "diversification and anti-coercion mechanisms" would actually have to be built, since China holds a dominant processing (not just mining) position. Competition here is more likely to play out through investment, debt, and infrastructure deals than military conflict, but it's central to whether the minerals stability regime means anything.

5. Latin America (Chile, Argentina, Bolivia's "lithium triangle"; Brazil, Panama, Mexico nearshoring)

Lithium and copper for the battery/EV sector, plus Mexico as the nearshoring beneficiary of US-China decoupling, plus Panama Canal/port infrastructure (a live flashpoint given recent US-China friction over Panama's ports). Lower military risk than Taiwan or the South China Sea, but high economic-coercion risk.

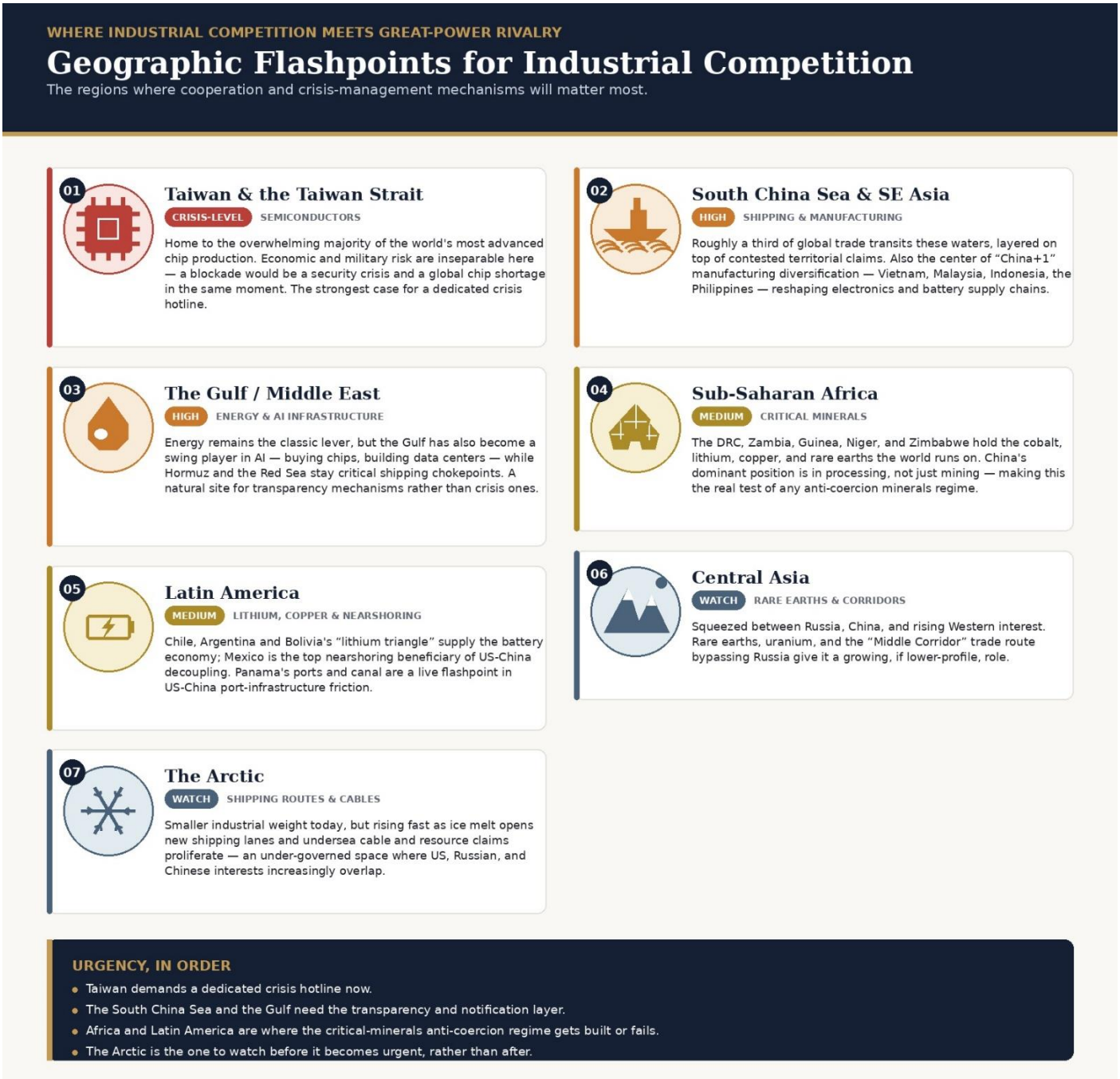
6. Central Asia

Increasingly squeezed between Russia, China, and Western interest — rare earths, uranium, and a corridor role (Middle Corridor trade route bypassing Russia). Lower profile but rising.

7. The Arctic

Smaller in current industrial weight but growing fast: shipping routes opening with ice melt, undersea cable and resource claims, and it's where US, Russian, and increasingly Chinese interests overlap in a genuinely under-governed space — a plausible site for the "satellites/space" and "telecoms" stability regimes to matter, alongside more traditional Arctic Council-style diplomacy.

Figure



Pulling the sectoral framework and the regional map together, a few implications stand out for how great-power diplomacy would actually need to be institutionalized.

1. Diplomacy has to be regional-sectoral, not just sectoral

The three-zone framework (green/yellow/red) works differently depending on where it's applied. Semiconductor rules that make sense for Taiwan don't transfer cleanly to critical minerals in the DRC — the actors, leverage, and escalation pathways are different. This argues against a single "AI dialogue" or "semiconductor dialogue" and for **regional sectoral cells** nested under the broader Great-Power Industrial Stability Dialogue — a Taiwan Strait cell, a South China Sea cell, a Gulf energy/AI cell, a critical-minerals Africa cell, and so on. Each needs its own membership (not always the same five or six powers), its own hotline, and its own definition of what counts as "red."

2. The crisis-tier and the management-tier need structurally different institutions

Taiwan is qualitatively different from the other six regions — it's the one place where the framework's "red zone" (military command, irreversible escalation) and "yellow zone" (chip supply chains) collapse into the same geography. That argues for:

- A **dedicated, standing crisis-communication channel** for Taiwan specifically — modeled less on trade diplomacy and more on Cold War nuclear-risk-reduction centers (the US-Soviet Nuclear Risk Reduction Centers are the closest historical analogy).
- Everywhere else, **lighter-weight, transparency-oriented mechanisms** — advance notification, joint monitoring, data-sharing — that don't require the same crisis-response infrastructure.

Institutionalizing these identically would either over-militarize routine economic diplomacy (Latin America, Central Asia) or under-resource the one place where speed matters most (Taiwan).

3. Minerals and nearshoring regions need economic institutions, not security ones

Africa and Latin America are where the "anti-coercion" language in the original framework gets tested, but the right institutions there look more like **multilateral investment and processing-capacity coordination bodies** (something between the G7's Partnership for Global Infrastructure and a minerals-specific IEA) than crisis hotlines. The implication: diplomatic bandwidth spent trying to fold these into a security dialogue would likely fail — coercion here is exercised through financing, offtake agreements, and processing bottlenecks, not military posture. The institutional tools are sanctions-adjacent and investment-adjacent, not hotline-adjacent.

4. Shipping chokepoints (South China Sea, Gulf, Arctic) call for a mixed model

These three regions share a structural feature — they're places where routine commercial transit and military escalation risk sit on top of each other — but they're at different institutional maturity:

- **Gulf**: has decades of naval deconfliction practice (US Fifth Fleet, informal Iran-US channels) — the task is extending that culture to AI infrastructure and energy leverage, not building from scratch.
- **South China Sea**: has weak existing mechanisms (ASEAN's Code of Conduct talks have dragged for years) — this is the one where new institutional investment would have the highest marginal value.
- **Arctic**: has the Arctic Council, but it's explicitly non-military by mandate and has been largely paralyzed since 2022. This is a case where the diplomatic architecture exists but has been hollowed out — the implication is less "build new" and more "decide whether to resuscitate or route around."

5. Institutional design should assume variable-geometry membership

A single standing body with fixed membership (US-China-EU-India-Japan) breaks down regionally: Central Asia diplomacy realistically needs Russia and the Gulf states at the table; African minerals diplomacy needs the DRC, Zambia, and Gulf/Chinese investors, not necessarily India or Japan. The practical implication is a **hub-and-spoke design**: a small permanent secretariat-style hub (housing shared definitions, notification protocols, crisis-simulation exercises) with regional spokes that convene different subsets of powers as needed. This mirrors how arms control actually institutionalized during the Cold War — SALT/START were bilateral, while things like the IAEA were multilateral — rather than assuming one table fits all problems.

6. The hardest institutional gap is the Taiwan/chip-supply overlap

No existing body cleanly owns "what happens to global chip supply if Taiwan Strait tensions escalate." Trade bodies (WTO) don't do security. Security bodies (NATO-adjacent structures) don't do supply chains. This is arguably the single most under-institutionalized risk in the entire framework, and where new architecture —

rather than adapting an existing body — is genuinely needed.

Want me to turn this into a companion visual (an institutional map showing which mechanism type — hotline, transparency regime, investment body — applies to each region), or keep building out the written framework?

Strategic restraint: capability is not obligation The first duty of a great power is to distinguish between what it can do and what it ought to do. Modern states possess an extraordinary range of economic instruments: export controls, investment restrictions, financial sanctions, tariffs, subsidies

Industrial Competition and the Architecture of Restraint: Toward a Sectoral-Geographic Framework for Great-Power Stability

The return of great-power rivalry has been accompanied by a proliferation of economic instruments — export controls, investment screening, financial sanctions, industrial subsidy — whose cumulative effect has outpaced the diplomatic architecture designed to govern their use. This article argues that the central danger of the present era is not competition itself but its *unbounded* character: the absence of shared definitions distinguishing ordinary commercial rivalry from activity that threatens strategic stability. Drawing on the logic of Cold War arms control, it proposes a sectoral-geographic framework — organized around differentiated "zones" of competitive intensity, sector-specific stability regimes, and a set of seven geographic sites where industrial competition and military risk are most acutely entangled — and derives from classical statecraft a set of operating principles by which such a framework might be institutionalized. The argument throughout is that stability among rivals has never required trust; it has required disciplined, reciprocal, and reversible restraint, communicated through institutions robust enough to outlast the leaders who create them.

Every era of great-power competition confronts the same underlying problem in a different technological guise. States possess instruments of coercion whose sophistication generally exceeds their capacity for self-restraint, and the interval between the acquisition of a capability and the development of norms governing its use is where crises are made. The present era is distinguished not by the novelty of this problem but by its density: semiconductors, artificial intelligence, critical minerals, shipbuilding, and financial infrastructure have each become, more or less simultaneously, arenas in which ordinary commercial competition threatens to shade into strategic confrontation. The diplomatic vocabulary available for managing this shift — largely inherited from either classical trade policy or Cold War arms control — has proven inadequate to either register.

This article advances a threefold argument. First, that the instinct to negotiate a single comprehensive settlement — an "industrial peace treaty" governing the totality of great-power economic relations — mistakes the nature of the problem; the risks in question are heterogeneous by sector and asymmetric by geography, and a framework built for one poorly serves the others. Second, that a more tractable approach begins by classifying competitive activity into zones of differing intensity, permitting vigorous rivalry where the stakes are genuinely commercial while reserving explicit, negotiated constraint for activity that threatens irreversible escalation. Third, that even a well-specified sectoral architecture remains incomplete without geographic grounding — because the sectors in question do not compete in the abstract, but in a small number of physical locations where supply chains, sovereignty disputes, and military posture converge. The article closes by deriving, from the broader tradition of statecraft concerned with the management of rivalry, a set of institutional principles — restraint, proportionality, reversibility, and their companions — through which such a framework might be given durable form.

The premise underlying any workable framework for great-power industrial competition is that capability does not constitute obligation. The modern state possesses an extraordinary repertoire of coercive economic instruments, and the mere possession of such instruments generates a standing temptation to deploy them whenever a rival's conduct proves displeasing. Yet a foreign policy organized around the continuous exercise of every available capability does not amount to a strategy; it amounts to the abdication of one. The distinction between the question *can we impose a cost* and the question *what follows when the other side answers* is, in a meaningful sense, the distinction between tactics and strategy — and it is a distinction that contemporary economic statecraft has not reliably preserved.

From this premise a series of subsidiary principles follow, each addressed to a specific pathology of unrestrained competition. *Proportionality* holds that the scope of an economic measure ought to track the scope of the security concern that motivates it — that a narrow anxiety about a particular class of military-relevant technology should not, without deliberate escalation, produce restrictions across an entire commercial relationship, since instruments that exceed their justification invite retaliation in unrelated domains and create constituencies with an interest in the retaliation's permanence. *Reversibility* holds that measures ought where possible to preserve an avenue of retreat, since irreversible action — the destroyed industry, the severed supply relationship, the repudiated

commitment — converts a temporary disagreement into a permanent structural fact, foreclosing exactly the flexibility that crisis management requires. *Transparency* holds that ambiguity is not free; an unexplained restriction invites the adversary to assume the broadest plausible hostile intent, so that defensive measures are read as preparations for economic strangulation. *Reciprocity*, properly understood, is distinguished from retaliation by its object: the former seeks equilibrium, tying one government's restraint to another's, while the latter seeks punishment and tends, characteristically, to escalate. And *differentiation* — perhaps the most intellectually demanding of the principles — insists that commercial competition, economic security, military security, and existential security remain analytically distinct categories, since a policy environment in which every foreign gain in market share is treated as a security threat has already lost the capacity for strategic judgment.

These principles are not merely dispositional; they imply institutional consequences. *De-escalation* requires that graduated response options exist between acquiescence and maximum coercion, since a binary choice between passivity and total escalation all but guarantees one or the other. *Compartmentalization* requires that disagreement in one domain be prevented, deliberately, from contaminating unrelated domains of cooperation — the alternative being a relationship that loses its stabilizing ballast entirely. *Face-saving* requires that settlements be constructed so that domestic audiences on both sides can regard them as consonant with national interest, since a technically sound agreement that cannot be domestically defended will not survive contact with domestic politics. And *institutionalization* — perhaps the master principle, in that it encompasses the durability of all the others — requires that these mechanisms not depend upon the personal rapport of incumbent leaders, since crises characteristically arrive at precisely the moments when personal trust is least available and institutional habit is most needed.

If restraint supplies the disposition, sectoral classification supplies the map. The central analytical move is to resist the temptation toward either extreme — treating all industrial competition as ordinary commerce, or treating all of it as a security matter — and instead to sort activity into three zones of differing diplomatic intensity.

In the *green zone*, competition proceeds by ordinary commercial means: price, subsidy, innovation, market share. States are permitted, and indeed expected, to compete aggressively, since the discipline of open rivalry is itself a source of efficiency and technological progress that neither side has an interest in forgoing. In the *yellow zone*, dual-use technologies and strategically concentrated supply chains require a diplomacy of managed competition — transparency obligations, targeted (rather than comprehensive) controls, and standing consultation — because the risk in these domains is not that competition occurs but that its opacity generates worst-case inference. In the *red zone*, activity bearing directly upon military command structures, nuclear forces, critical civilian infrastructure, or genuinely irreversible escalation requires explicit, negotiated constraint and dedicated crisis-management infrastructure, on the model of Cold War arms control rather than trade policy.

The analytical value of this tripartite structure lies precisely in its restriction of the red zone's scope. A framework that classifies every strategically relevant industry as a matter of existential security has, in an important sense, already failed, since the discipline of red-line reasoning depends upon scarcity: a government that treats every dispute as vital eventually confronts the choice between acting upon threats it never truly meant and retreating in a manner that discredits every future warning. The nine sectors most frequently implicated in this debate — semiconductors, artificial intelligence, critical minerals, energy, shipbuilding, telecommunications, satellites, batteries and electric vehicles, and cross-border finance — accordingly warrant differentiated treatment. Semiconductors and artificial intelligence sit closest to the red zone by virtue of their direct bearing on military capability and command; critical minerals and energy occupy the yellow zone's coercion-vulnerable middle ground, where the diplomatic objective is less prohibition than diversification; and batteries, electric vehicles, and much of telecommunications infrastructure remain, for the present, predominantly commercial matters whose principal risk is that trade friction becomes miscategorized as security confrontation.

The corresponding institutional proposal — a standing, permanent forum bringing together the principal industrial powers not to eliminate competition but to govern its safe conduct — follows naturally from this classification. Its function would be definitional and procedural rather than adjudicative: establishing shared vocabulary for what counts as a genuinely military-sensitive technology, creating advance-notification norms for major export-control actions, and maintaining sectoral communication channels through which ambiguity can be resolved before it hardens into worst-case assumption.

A sectoral taxonomy, however well specified, remains an abstraction until it is grounded in geography — because the sectors in question do not compete in a placeless market but converge, with unusual density, in a small

number of physical locations where industrial capacity, sovereignty disputes, and military posture are already entangled. Seven such sites merit particular attention, distinguished not merely by the sector each implicates but by the *institutional register* appropriate to each.

The Taiwan Strait occupies a category of its own. It is the site at which the yellow zone (semiconductor supply) and the red zone (military command and irreversible escalation) are not merely adjacent but coincident — a condition found nowhere else in the framework, and one that argues for crisis-management infrastructure modeled on the Cold War's nuclear-risk-reduction centers rather than on ordinary trade diplomacy. Where the plausible near-term crisis is not invasion but coercive quarantine, the governing principles are red-line discipline — since ambiguity here does not reduce risk but invites its testing — and face-saving, since any durable de-escalation will require that all parties be able to narrate the outcome as consistent with deterrence rather than retreat.

The South China Sea presents a structurally different problem: not the coincidence of supply chain and command structure, but the coincidence of contested sovereignty and the ordinary shipping lanes through which perhaps a third of global trade transits, layered upon a rapid reorganization of manufacturing capacity across Southeast Asia. Here the operative principle is joint fact-finding, since the plausible crisis — a maritime collision, an armed confrontation over a resupply mission — is one in which attribution will initially be uncertain and the temptation toward immediate, treaty-triggering response correspondingly dangerous.

The Gulf combines the classical instrument of energy leverage with an emergent role in artificial intelligence infrastructure, atop shipping chokepoints whose disruption carries civilian as well as strategic cost. Because the region possesses, in the naval deconfliction practices developed over decades, more institutional ballast than any other flashpoint examined here, the appropriate diplomatic task is extension rather than construction — broadening an existing culture of restraint to newly strategic domains rather than building crisis infrastructure from nothing.

Sub-Saharan Africa and Latin America together constitute the geography in which the critical-minerals and nearshoring dimensions of the sectoral framework will be either vindicated or exposed as rhetorical. The risk in each is not military confrontation but coercion exercised through financing, offtake agreements, and processing-capacity concentration — a distinction with direct institutional consequence, since it implies that the relevant mechanisms are investment-coordination and diversification bodies rather than security dialogues, and that measures adopted in haste (an abrupt investment restriction, a sudden change in port ownership rules) risk violating the reversibility principle in domains where reversal is especially costly.

Central Asia and the Arctic, finally, represent the framework's frontier — regions of currently modest industrial weight whose strategic salience is rising, in the first case through rare-earth deposits and trade corridors bypassing Russia, in the second through the opening of new shipping lanes and the proliferation of undersea infrastructure. Each is distinguished by an institutional deficit rather than an institutional failure: Central Asia lacks a natural governing body, while the Arctic possesses one — the Arctic Council — whose non-military mandate leaves it structurally unable to address the very risks now accumulating within its territory. The appropriate diplomatic posture toward each is anticipatory rather than reactive: the construction, or reconstitution, of institutional capacity before the crisis that would otherwise force improvisation.

The preceding sections imply a specific architectural conclusion, one that departs from both extremes commonly proposed in the literature: neither a single comprehensive great-power accord, whose uniformity would misapply crisis-grade mechanisms to essentially commercial disputes and under-resource the genuinely urgent case of Taiwan, nor a wholly ad hoc, case-by-case diplomacy, whose absence of institutional memory would leave each crisis to be managed without reference to precedent or established channel.

The more defensible model is one of variable geometry: a small permanent hub, charged with maintaining shared definitions, notification protocols, and periodic crisis simulation, from which regional and sectoral spokes extend outward, each convening the specific subset of powers relevant to its domain. Such a structure mirrors, deliberately, the institutional pluralism of Cold War arms control — bilateral where the risk was bilateral, multilateral where verification and monitoring required broader participation — rather than assuming that a single table can adjudicate every category of dispute. Its success would be measured, in the final analysis, by a distinctly unglamorous criterion: an institution so unremarkable in its ordinary operation that its value becomes visible only retrospectively, in the crisis that did not occur.

Summary

In summary, industrial competition now sits at the intersection of geoeconomics and geopolitics. States

increasingly use industrial capacity, technology, trade, finance, energy, infrastructure, and supply chains not merely to generate prosperity but to acquire strategic autonomy, influence other states, and shape the distribution of international power. At the same time, geopolitical rivalry increasingly determines which technologies are considered strategic, which markets remain open, and which forms of economic interdependence are regarded as acceptable.

This transformation creates a difficult tension between regionalism and multilateralism. Regional arrangements can provide resilience, trusted supply chains, common standards, investment coordination, and greater bargaining power. The European Union, for example, demonstrates how states can pool industrial and regulatory capabilities in order to compete more effectively in a fragmented global economy. Similar forms of regional cooperation can emerge in North America, East Asia, the Gulf, South Asia, and elsewhere. Regionalism can therefore serve as a practical layer between national industrial policy and the global system.

Yet regionalism also carries a danger. If regional economic blocs become instruments of geopolitical exclusion, the global economy can fragment into competing technological and industrial spheres. Supply chains become politicized, standards diverge, investment flows become restricted, and countries are increasingly pressured to choose sides. What begins as regional resilience can therefore evolve into bloc competition. The objective should consequently be regional cooperation without regional economic militarization.

Multilateralism remains essential precisely because no major power can manage the consequences of industrial competition alone. Critical minerals, energy markets, shipping, financial systems, climate technologies, artificial intelligence, telecommunications, and global supply chains cross national and regional boundaries. Even powerful states remain dependent upon systems they cannot completely control. Multilateral institutions can provide common rules, transparency, dispute settlement, information exchange, and mechanisms for preventing commercial disputes from becoming strategic crises.

The emerging order should therefore not be understood as a choice between globalization and autarky, or between regionalism and multilateralism. A more sustainable model is layered interdependence: national resilience at the domestic level, regional cooperation at the intermediate level, and multilateral rules at the global level. Each level performs a different function. National policy protects genuinely strategic capabilities; regional institutions provide scale and resilience; multilateral institutions preserve openness and prevent rivalry from becoming systemic fragmentation.

The central challenge is to prevent geoeconomics from becoming indistinguishable from geopolitics. Economic instruments will inevitably serve strategic purposes, but if every industrial policy becomes a geopolitical weapon, commercial relations themselves become a security dilemma. The more that states perceive dependence as vulnerability, the more they seek autonomy; the more they seek autonomy, the more their competitors perceive exclusion; and the more exclusion grows, the more likely economic competition becomes a source of political and eventually military confrontation.

The strategic objective should therefore be competitive coexistence. Great powers will compete over industrial leadership, technological standards, markets, investment, resources, and influence. They should nevertheless retain common rules and institutions through which competition can be bounded. Regional partnerships should strengthen resilience without creating rigid blocs; multilateral institutions should remain sufficiently flexible to accommodate legitimate national-security concerns without permitting those concerns to become a universal justification for protectionism and coercion.

In this sense, the future of international order may depend upon finding a new equilibrium between the three levels of governance: the national, the regional, and the multilateral. The national level supplies strategic capacity; the regional level supplies collective resilience; and the multilateral level supplies rules and communication. None is sufficient on its own.

The wager underlying the above outlined framework is the same wager that underlay the arms-control architecture of the preceding great-power rivalry: that stability does not require the parties to like one another, trust one another, or share a conception of the international order's ultimate ends. It requires only that they share an interest in avoiding outcomes neither side actually wants, and the institutional discipline to translate that shared interest into durable practice — advance notification instead of surprise, proportionality instead of maximal response, reversibility instead of permanent rupture, and communication that continues precisely when it is most difficult to sustain. The object of such a framework is not to arrest the rise of any power, nor to resolve the disagreements that divide them. It is the considerably more modest, and considerably more achievable, objective of ensuring that intense competition need not conclude that war — economic or otherwise — is the only available means of its resolution.

The ultimate task of diplomacy is therefore not to

eliminate industrial competition but to civilize it: to ensure that the struggle for technological and productive advantage remains compatible with economic interdependence, regional cooperation, and multilateral stability. The great powers of tomorrow will almost certainly compete. The question is whether they will compete within institutions capable of preserving peace—or whether industrial rivalry will gradually harden into geopolitical blocs and make conflict increasingly difficult to avoid.

26.Strategic Industry Map: EU, United States, China, India and Russia

The world's industrial geography is highly uneven, with the greatest concentration of industrial activity in **East Asia, North America and Western Europe**. China is the world's major manufacturing centre, with large industries including electronics, machinery, automobiles, steel and chemicals. The United States, Germany, Japan and South Korea are also important industrial powers, while India is rapidly expanding its manufacturing sector.

The strategic importance of these industrial regions is linked to their access to **large markets, skilled labour, infrastructure, energy, raw materials, technology and international trade routes**. Major ports and transport corridors are particularly important because they connect industrial production with global markets.

The geography of global industry is also changing. Manufacturing has increasingly expanded towards countries such as **Vietnam, India, Mexico, Indonesia and parts of Eastern Europe**, as companies seek lower production costs and more diversified supply chains. This is reducing the dominance of some traditional industrial centres while creating new manufacturing hubs.

The implications are significant. Countries with strong industrial capacity have greater **economic and geopolitical influence**, while dependence on particular regions for critical goods such as semiconductors, batteries, energy technologies and pharmaceuticals can create strategic vulnerabilities. As a result, governments and companies are increasingly focusing on **supply-chain resilience, industrial security and domestic production**.

In the future, industrial geography is likely to be shaped by **technology, renewable energy, artificial intelligence, automation and geopolitical competition**. New industrial centres may develop around clean energy and advanced technologies, creating a more interconnected but also more strategically competitive global industrial map.

Executive map

Power	Strategic industrial model	Core advantages	Main vulnerabilities	Policy objective
European Union	Regulated, green and coalition-based industrial power	Advanced capital goods, chemicals, pharmaceuticals, aerospace, automotive, engineering, single market and standards	High energy costs, fragmented capital markets, external dependence for energy, chips and critical raw materials, slower scale-up	Decarbonise industry while rebuilding strategic production capacity
United States	Innovation, finance, defence and platform-led power	AI, software, cloud, aerospace, defence, biotech, advanced services, semiconductors and deep capital markets	Dependence on Asian manufacturing for parts of electronics, critical minerals and some supply chains	Preserve technological leadership and secure critical production

China	State-coordinated manufacturing and value-chain dominance	Industrial scale, infrastructure, batteries, solar, EVs, electronics, machinery, rare-earth processing and logistics	External dependence for selected advanced equipment, foreign markets and some upstream technologies; demographic and debt pressures	Move from manufacturing scale to technological self-reliance and higher value added
India	Large-market, services-to-manufacturing transition	Digital services, pharmaceuticals, engineering talent, space, defence, expanding electronics and a large domestic market	Infrastructure and logistics gaps, skills unevenness, dependence on imported energy, components and advanced chips	Raise manufacturing share, integrate into global value chains and build technological sovereignty
Russia	Resource, defence and state-directed resilience model	Oil and gas, nuclear technology, metals, fertilisers, grain, missiles, air defence and military production	Sanctions, restricted access to advanced machinery and components, demographic constraints and narrow high-tech base	Replace imports, expand non-energy exports and preserve defence-technological capacity

Key takeaways

The EU's industrial position is fundamentally different from that of its major competitors and partners. **The United States derives power primarily from technological innovation, finance, digital platforms and defence; China from manufacturing scale, state coordination and control of strategic value chains; India from market scale, digital capabilities and an expanding transition from services towards manufacturing; and Russia from natural resources, energy, defence and strategic state capacity.**

The EU's distinctive strength lies in its **advanced and diversified industrial base**, particularly in capital goods, chemicals, pharmaceuticals, aerospace, automotive, engineering and increasingly clean technologies, reinforced by the scale of the Single Market and the international influence of European standards.

The central European vulnerability is that **industrial sophistication does not automatically translate into global technological and economic leadership**. High energy costs, fragmented capital markets, dependence on external suppliers for critical inputs, and difficulties in scaling innovative firms can prevent Europe from capturing the full value generated by its knowledge and industrial capabilities.

The green and digital transitions therefore create a strategic choice. Europe must avoid replacing old dependencies with **new dependencies on batteries, semiconductors, digital infrastructure, critical minerals and clean technologies**. Strategic autonomy should consequently mean maintaining sufficient technological and industrial options, rather than attempting complete self-sufficiency.

The most important policy priority is to identify the sectors where **economic value, technological capability and geopolitical importance overlap**. These include semiconductors, AI and digital infrastructure, advanced machinery, batteries and energy storage, critical-mineral processing and recycling, clean technologies, advanced materials, pharmaceuticals and biotechnology, aerospace and defence.

The EU should also recognise that **partnership is a source of power**. India, for example, can contribute to diversification and manufacturing capacity, while other trusted partners can provide resources, technologies,

markets and production capabilities. Economic diplomacy therefore becomes an extension of industrial policy.

The key shift is from **protecting industries indiscriminately to making strategic choices about capabilities**. Europe should determine which activities it must lead, which it must remain competitive in, which dependencies it should diversify, and where international markets provide sufficient security.

Ultimately, the objective is to combine **competitiveness with resilience, strategic autonomy with openness, and industrial strength with economic diplomacy**. If successful, this would allow Europe not merely to respond to the geopolitical consequences of the green and digital transitions, but to shape them in ways that support **economic prosperity, cooperation, stability and peace**.

2. Sectoral strategic matrix

Sector / value chain	EU	United States	China	India	Russia	Strategic reading
AI, cloud and digital platforms	S	L	S	G	D/S	US leads frontier platforms and cloud; China has scale; EU has regulation and industrial AI potential; India supplies talent and services.
Semiconductors: design, equipment and fabs	S	L	S/G	G	D	The US leads design and ecosystem control; the EU is strong in equipment and automotive chips; China is expanding domestic capacity; India is building fabs and packaging.
Quantum technologies	S/G	L	S	G	S	A high-spillover field linking computing, sensing, defence and secure communications.
Aerospace and space	L/S	L	S	G/S	S	US remains strongest overall; EU has civil aerospace and launch capabilities; China is rapidly scaling; India and Russia retain strategic niches.
Defence and security industry	S	L	L/S	G/S	L/S	Defence production is increasingly integrated with AI, sensors, drones, space and advanced materials.
Automotive and electric vehicles	L/S	S	L	G	D/S	China dominates EV scale and batteries; EU retains premium vehicles and engineering; the US leads selected software and platform segments.
Batteries and energy storage	S	S/G	L	G	D/G	China has the deepest commercial chain; the EU and US are pursuing resilience; India is building domestic capacity.
Solar, wind and clean technology	S	S	L	G	D/S	China dominates solar manufacturing; the EU is strong in selected wind and industrial technologies; the US leads innovation and finance.
Steel, aluminium, chemicals and materials	L/S	S	L	G/S	S	China has scale; the EU has high-end chemicals and advanced materials but faces energy-cost

						pressure; Russia retains resource and metallurgy advantages.
Pharmaceuticals and biotechnology	L/S	L	S	L/S	G/S	US leads frontier biotech and finance; EU and India have strong pharmaceutical capabilities; China is moving up the innovation chain.
Nuclear energy	S	S	L/S	G/S	L	Russia remains a major exporter of nuclear technology; China is scaling; the EU and US retain advanced capabilities but face deployment constraints.
Oil, gas and energy equipment	D/S	S	D/S	D	L	Russia remains resource-strong but technologically exposed; the US has strong hydrocarbons and services; the EU is structurally import-dependent.
Critical minerals and processing	D	D/S	L	G/S	S/G	Processing capacity is more strategically important than extraction alone; China has major leverage in refining and downstream chains.
Industrial machinery and robotics	L	S	L/S	G	S/D	EU and Japan-like engineering strengths are central to industrial competitiveness; China is closing gaps through scale and localisation.
Digital services and business-process exports	S	L	S	L	D	India's comparative advantage is strongest in digitally enabled services, software and engineering support.
Agriculture, food and fertilisers	S	L/S	S	S	L/S	Russia is strong in grain and fertilisers; the US and EU have advanced agrifood systems; India's domestic market is strategically decisive.

Key implications for the EU

The comparison shows that there is no single global industrial leader. Different countries dominate different layers of the value chain. The United States is strongest where frontier innovation, digital platforms, finance and defence intersect; China is strongest where manufacturing scale, infrastructure, processing and integrated supply chains matter; India is strongest in digital services, pharmaceuticals, engineering talent and emerging manufacturing; Japan remains exceptionally strong in precision manufacturing, robotics, materials, automotive technology and industrial equipment; while Russia's influence is concentrated in energy, raw materials, nuclear technology, fertilisers and defence.

For the EU, the strategic implication is that competitiveness must be selective. Europe does not need to lead every stage of every value chain. It needs to identify those capabilities where European leadership produces the greatest combination of gross value added, technological spillovers, employment, productivity, resilience and strategic autonomy.

The most important European priorities are therefore likely to be advanced machinery and robotics, aerospace, pharmaceuticals and biotechnology, semiconductors and semiconductor equipment, advanced materials and chemicals, clean industrial technologies, automotive technologies, energy systems, and selected areas of AI and industrial digitalisation.

The table also reveals a particularly important vulnerability: **Europe can be technologically strong downstream while remaining strategically exposed**

upstream. Batteries, critical minerals, semiconductors, energy inputs and digital infrastructure demonstrate how dependence at one point in a value chain can weaken otherwise highly competitive European industries.

This means that the EU's strategic objective should be **control of critical capabilities rather than control of every commodity**. Where Europe cannot realistically reproduce an entire value chain, it should combine domestic capacity with diversified sourcing, recycling, substitution, technological innovation and trusted international partnerships.

Japan is particularly relevant as a partner in this model because its strengths in **robotics, advanced materials, precision engineering, automotive technology and semiconductor-related manufacturing** complement several European capabilities. India similarly offers opportunities for diversification in **digital services, pharmaceuticals, engineering and emerging manufacturing**, while also becoming an increasingly important competitor in selected sectors.

The broader lesson is that the geopolitical economy of the green and digital transitions is increasingly determined by **value-chain position rather than simply by national industrial size**. A country can possess relatively little raw material extraction but exercise enormous strategic power through refining, processing, equipment, intellectual property, software or manufacturing scale.

For Europe, this makes the combination of **NACE → industry, PRODCOM → production, HS → trade and dependency, and ISIC → international comparison** particularly valuable. It provides the basis for identifying precisely where Europe creates value, where it depends on others, where its competitors are gaining ground, and where intervention can generate the greatest strategic return.

The ultimate policy objective should therefore be to build a **portfolio of European industrial capabilities**: lead where Europe has genuine competitive advantage, strengthen resilience where dependencies are strategic, diversify where concentration creates geopolitical risk, and cooperate internationally where interdependence creates greater prosperity and stability.

In that sense, industrial competitiveness becomes more than an economic objective. It becomes an instrument of strategic autonomy, economic diplomacy and resilience—and, by creating more diversified and cooperative relationships between major industrial powers, potentially an instrument for managing competition peacefully rather than allowing economic rivalry to become geopolitical confrontation.

3. Power-specific strategic profiles

European Union

Industrial centre of gravity: advanced manufacturing, chemicals, machinery, automotive, aerospace, pharmaceuticals, renewable-energy equipment and industrial services.

Strategic instruments: Clean Industrial Deal, Net-Zero Industry Act, Critical Raw Materials Act, Strategic Technologies for Europe Platform, public procurement and state-aid tools.

Key proposition: the EU's strategic advantage is not simply production volume. It is the combination of a large integrated market, regulatory power, high-value engineering, standards, industrial know-how and the capacity to form external partnerships.

Main risk: the EU can remain technologically sophisticated while losing production scale. Affordable energy, faster permitting, deeper capital markets, skills and coordinated procurement are therefore central to strategic autonomy.

United States

Industrial centre of gravity: AI, cloud, software, semiconductors, aerospace, defence, biotechnology, advanced manufacturing, finance and energy.

Key proposition: the United States combines frontier research, venture capital, major firms, military procurement, global financial power and a large domestic market. Its industrial strategy is increasingly centred on critical and emerging technologies, especially AI, quantum, biotechnology and semiconductors.

Main risk: strategic exposure remains in mineral processing, electronics assembly and some Asian manufacturing dependencies. The US is strongest when it links technology leadership to allied production networks.

China

Industrial centre of gravity: electronics, machinery, EVs, batteries, solar, telecommunications, shipbuilding, materials, industrial automation and infrastructure.

Key proposition: China's distinctive power is system-level manufacturing: it can coordinate finance, infrastructure, suppliers, engineering, logistics and domestic demand at continental scale.

Main risk: restrictions on advanced equipment and foreign technology, weak external demand, property and debt pressures, and the need to convert manufacturing scale into frontier innovation.

India

Industrial centre of gravity: pharmaceuticals, digital services, electronics assembly and design, automotive, space, defence, textiles, chemicals and emerging semiconductor activities.

Key proposition: India offers a large labour force, engineering and software capabilities, a growing domestic market and geopolitical attractiveness as a diversification partner.

Main risk: the country must close gaps in logistics, industrial ecosystems, skills, energy reliability and component supply. Its strategic opportunity is to connect digital capability with physical manufacturing.

Russia

Industrial centre of gravity: hydrocarbons, nuclear, defence, aerospace and missiles, metals, fertilisers, grain, chemicals and selected heavy industries.

Key proposition: Russia retains major resource depth and defence-industrial capabilities, particularly where state demand, accumulated scientific expertise and domestic raw materials matter.

Main risk: sanctions and technology restrictions constrain advanced machinery, electronics, aviation and energy equipment. Import substitution can preserve basic capacity but does not automatically recreate globally competitive innovation ecosystems.

5.Cross-border dependencies

Dependency relationship	Strategic meaning
EU–China	The EU gains access to manufactured inputs and clean technologies but faces competitive pressure in EVs, solar, batteries, machinery and critical-material processing.
EU–United States	A powerful transatlantic technology and security relationship, but also a source of competition over subsidies, digital regulation, defence procurement and green industry.
EU–India	A promising diversification and co-development relationship in pharmaceuticals, digital services, engineering, defence, clean technology and resilient supply chains.
EU–Russia	Energy and raw-material interdependence has been transformed by war and sanctions into a security and decoupling problem.
US–China	The central technology and industrial rivalry, especially in semiconductors, AI, telecommunications, batteries, aerospace and military-civilian technologies.
US–India	Increasingly important for semiconductor packaging, digital services, defence, space, pharmaceuticals and supply-chain diversification.
China–Russia	Complementary relationship: China supplies industrial goods and technology inputs while Russia supplies energy, commodities and strategic cooperation. It is asymmetric in China's favour.
China–India	Competitive and interdependent relationship, especially in electronics, pharmaceuticals, energy, infrastructure and regional supply chains.
India–Russia	Established defence, energy and nuclear links, but increasingly constrained by technology access, payments, sanctions and India's diversification toward other partners.

Cross-border dependencies

There is nothing wrong with depending on your neighbours. Civilisation would be a rather lonely affair if every country insisted on making everything itself, from its own batteries to its own buttons. The trouble begins when you discover that the neighbour who supplies your batteries also owns the factory, the railway, the harbour and, perhaps, the only road home.

This is the predicament facing Europe. The European Union does not need to manufacture everything within its borders; it needs to know **which things it cannot afford to lose**. A cheap supply is useful, but a cheap supply that can disappear at precisely the wrong moment is rather less cheap than it first appeared.

China presents the clearest example. Europe gains enormously from Chinese manufacturing, yet in batteries, solar equipment, electric vehicles and critical materials, dependence can become a source of weakness. The sensible response is not to stop trading with China, which would be like burning down the grocery because one dislikes the grocer. It is to ensure that Europe has alternatives.

The United States presents a different problem. Europe and America are allies, trading partners and technological collaborators, but allies are still countries with interests of their own. Europe therefore needs the American relationship without becoming incapable of acting when Washington chooses another road.

India may prove particularly useful in this respect. It offers Europe another large economy with growing capabilities in pharmaceuticals, digital services, engineering and manufacturing. Diversification is rarely exciting, but it has the excellent quality of making surprises less dangerous.

Russia taught Europe the cost of confusing commerce with security. Energy bought cheaply remains cheap only until the political circumstances change. After that, economists discover the amusing inconvenience that **geography and geopolitics are not listed on the invoice**.

The lesson is therefore quite simple. Europe should not attempt to eliminate dependence; that would be an expensive form of self-imprisonment. It should instead distinguish between **dependence that is convenient and dependence that is dangerous**.

Some relationships can be left to the market. Others require several suppliers, trusted partners or a European alternative. A few require domestic capacity because the consequences of losing them would extend far beyond the balance sheet.

The purpose of strategic autonomy, then, is not to make Europe independent of everybody. It is to make Europe **dependent on nobody to the point of helplessness**.

That is the real meaning of resilience: keeping enough doors open that, when one closes, Europe does not discover that it has built its entire house around it.

Policy implications

The European Union should not treat every industry in the same manner, because industries differ in their economic importance, technological value and strategic significance. Some industries should be strengthened because Europe already possesses the knowledge, firms and markets required to compete successfully. Others should be protected because excessive dependence on foreign suppliers could weaken European security or political freedom. Some established industries must be transformed because the green and digital transitions are changing the conditions under which they compete. In other areas, Europe should remain open to international trade where foreign production is efficient and reliable.

Lead

Europe should strengthen the industries in which it already has significant capabilities and a realistic prospect of maintaining international leadership. This requires sustained investment in research, innovation, productive capacity, skills and the ability of European firms to grow to global scale. European industrial policy should also use the Single Market and international partnerships to strengthen exports and establish European standards where appropriate.

Secure

Where external dependence creates a serious strategic vulnerability, Europe should develop greater resilience. This does not necessarily mean producing everything domestically. It means ensuring alternative sources of supply, maintaining sufficient European capabilities, developing strategic reserves where necessary, and strengthening cooperation with reliable partners. The objective is to prevent an external supplier from acquiring excessive leverage over essential European industries.

Transform

Industries facing the green and digital transitions should not simply be protected in their existing form. They should be given the conditions to modernise through investment in new technologies, energy systems, infrastructure, skills,

automation and productivity. The purpose is to ensure that decarbonisation and digitalisation strengthen European competitiveness rather than accelerate industrial decline.

Manage dependence

There are also industries in which complete European self-sufficiency would be too expensive or unnecessary. In these cases, Europe should accept international dependence while avoiding excessive concentration on a single supplier or country. Diversification, alternative suppliers, technological substitution and resilient trade relationships can provide security without imposing the costs of economic isolation.

Strategic conclusion

The major industrial powers possess different forms of economic strength. The United States combines technological leadership with deep financial markets and powerful digital companies. China combines manufacturing scale with extensive supply chains and growing technological capabilities. India combines a large market, skilled labour and strong capabilities in services and pharmaceuticals with an expanding manufacturing base. Russia derives much of its strategic economic power from energy, natural resources, nuclear technology and defence. Europe's strength lies in its sophisticated industrial base, engineering capabilities, research institutions, large internal market and capacity to establish standards and build international coalitions.

Europe therefore does not need to reproduce the industrial model of any other power. It needs to understand where its own strengths can generate the greatest economic and strategic returns, where its vulnerabilities require action, and where cooperation is more advantageous than self-reliance.

The purpose of industrial policy should consequently not be to make everything in Europe. It should be to ensure that, in the industries upon which European prosperity, security and technological development depend, Europe possesses sufficient capability to choose, negotiate and act. Strategic autonomy is therefore best understood not as isolation from the world economy, but as the capacity to remain open to the world while retaining the freedom to determine Europe's own economic and strategic choices.

It should cooperate and seek multilateral solutions in industrial sectors where interdependence is unavoidable and where collective action can produce greater resilience and efficiency than national self-sufficiency. This is particularly important in critical raw materials, semiconductors, energy systems, batteries, pharmaceuticals, biotechnology, aerospace, digital infrastructure, artificial intelligence, advanced machinery and clean technologies. In these sectors, the EU should work with the United States, India, Japan and other trusted partners to diversify supply chains, develop common standards, coordinate research and investment, and establish reliable rules for international trade and technology cooperation. Such an approach would allow Europe to strengthen its strategic autonomy without turning industrial policy into economic isolation. The objective should be to reduce dangerous concentrations of dependence while preserving beneficial interdependence, making industrial competition more stable and cooperation more durable.

27. The EU in the Global Industrial Pentarchy: Competitiveness, Strategic Dependencies and the Race for Industrial Power

The push-ups desired by the European Roundtable of Industialists concerning the data infrastructure feeding into policy-making in the EU commission evolves around how EU Industry compares with the United States, China, India and Russia reveals a world economy increasingly shaped by five distinct forms of industrial power. Each economy possesses a different combination of manufacturing capacity, employment, productivity, technological capability, natural resources, domestic market size, trade strength and growth potential. The comparison therefore cannot be reduced to a simple ranking of economic size. China derives exceptional power from manufacturing scale and supply-chain density; the United States from technology, capital and productivity; India from demographic scale and industrial growth potential; Russia from resources and strategic industries; and the European Union from the breadth, sophistication and diversification of its industrial base.

For the European Union, this comparison is particularly important because its competitive position is neither clearly dominant nor structurally weak. Europe remains a major industrial power with world-class capabilities in machinery, chemicals, pharmaceuticals, automotive, aerospace, energy technology and advanced manufacturing. At the same time, the EU faces growing pressure from China's manufacturing scale, the United States' technological and financial advantages, India's rapid industrial expansion and Russia's continuing importance in resources and strategic industries. The central question is therefore not whether Europe remains an industrial power, but whether it can convert its considerable economic, technological and human-capital assets into sufficient productivity, corporate scale and strategic autonomy to remain one of the world's decisive industrial centres.

1.Pentarchy master cross-tab

Indicator	European Union	United States	China	India	Russia
Employment	Very large	Large	Very large	Very large	Medium
Output / revenue	Very large	Very large	Very large	Large	Medium
Value added	Very large	Very large	Very large	Large	Medium
Exports	Very large	Large	Very large	Medium, rapidly rising	Large relative to economy
Imports	Very large	Very large	Very large	Large, rapidly rising	Medium
Productivity	High	Very high	High in leading sectors	Medium, improving	Medium–high in selected sectors
Number of firms	Very large	Very large	Very large	Very large	Large
Growth	Low–medium	Medium	Medium–high	High	Medium
Global manufacturing market share	Very large	15.0%	31.8%	3.2%	1.3%
Industrial diversification	Very high	Very high	Very high	High	Medium
Technology intensity	Very high	Highest	High and rising	High in selected sectors	High in selected sectors
Resource power	Medium	High	High	Medium	Very high
Industrial scale	Very high	Very high	Highest	High and expanding	Medium
Industrial growth potential	Medium	High	High	Very high	Medium
Strategic industrial autonomy	High	Very high	Very high	Rising	High in selected strategic sectors

The first lesson is that China's industrial scale is the most difficult fact in the table to ignore, with roughly 31.8% of global manufacturing value added in the cited UNIDO comparison. The United States remains extraordinarily powerful despite having a smaller manufacturing workforce, because productivity and high-value industries compensate for scale. The EU's strength is less spectacular in any single category but unusually broad across machinery, chemicals, vehicles, pharmaceuticals, aerospace and other sophisticated activities. India's defining characteristic is different again: its industrial base is already enormous in absolute terms, while its productivity and manufacturing share leave considerable room for expansion. Russia looks smaller when judged by aggregate manufacturing, but that understates its strategic position in energy, minerals, nuclear technology, metals and defence. The table therefore exposes the weakness of using GDP alone as a measure of industrial power.

A country can dominate employment, exports, technology, resources or productivity without dominating all of them

simultaneously.The Pentarchy is consequently better understood as five different forms of industrial power rather than five versions of the same economy.

2.Economic scale

Dimension	EU	USA	China	India	Russia	Pentarchy leader
Industrial employment	Very high	High	Very high	Very high	Medium	China / India
Industrial output	Very high	Very high	Very high	High	Medium	China / USA / EU
Manufacturing value added	Very high	Very high	Highest	High	Medium	China
Domestic market	Very large	Very large	Very large	Very large	Large	USA / China / EU / India
Export capacity	Very high	High	Very high	Medium	High in resources	China / EU
Import capacity	Very high	Highest	Very high	High	Medium	USA
Industrial diversification	Very high	Very high	Very high	High	Medium	EU / USA / China

The scale table shows that no single Pentarchy member wins every category, which is precisely why simplistic rankings are misleading.

China's manufacturing system has the greatest physical scale, giving it extraordinary leverage over supply chains, production volumes and industrial learning. The United States possesses an enormous market while also retaining exceptional purchasing power, allowing domestic demand to support industries that do not depend exclusively on exports.The EU combines a huge consumer market with a dense network of specialized industrial economies, although that strength is institutionally fragmented across member states. India's enormous domestic market gives its industries something China had during its great expansion: the ability to scale production domestically before conquering foreign markets. Russia's market is substantial but its industrial scale is disproportionately dependent on particular sectors rather than an equally broad manufacturing ecosystem. The important asymmetry is therefore between scale concentration and industrial breadth.

China has the strongest scale advantage, while the EU and United States possess unusually broad systems capable of converting capital, technology and specialized knowledge into high-value production.

3.Employment versus productivity

Economy	Employment scale	Productivity	nterpretation
EU	Very high	High	Large, diversified high-value

			industrial base
USA	High	Very high	Smaller industrial workforce but very high value generation per worker
China	Very high	High	Enormous labour base combined with increasingly advanced production
India	Very high	Medium	ıge labour pool with substantial productivity-growth potential
Russia	Medium	edium–high in selected industries	Concentrated expertise in energy, metals, defence and strategic industries

This table may be the most revealing because workers are not interchangeable units of industrial power. China and India possess enormous employment pools, but the economic value generated by each worker differs substantially across sectors. The United States demonstrates the opposite model: fewer industrial workers can support enormous output when capital intensity, technology and organizational productivity are exceptionally high. The EU occupies an intermediate position, combining substantial industrial employment with sophisticated production systems. India's relatively lower productivity is not necessarily only a weakness; it represents a huge potential source of future growth if capital and technology raise output per worker. China's transformation is particularly significant because it has combined massive employment with rapid increases in industrial sophistication. Russia's productivity is highly uneven, with technologically sophisticated enclaves sitting beside resource-intensive industries.The real contest is therefore not simply who employs the most people, but who can turn each worker into the greatest amount of economically and strategically useful production.

4.Trade position

Economy	Exports	Imports	Trade structure	Main characteristic
EU	Very high	Very high	Highly diversified	Major integrated industrial trading bloc
USA	High	Very high	High-value goods + services + advanced technology	Large importer and high-value exporter
China	Very high	Very high	Manufacturing-heavy	Major industrial export platform
India	Medium	High	Services + manufacturing + commodities	Rapidly integrating into global value chains
Russia	High	Medium	Energy/resources + selected industrial goods	Export concentration
Pentarchy	Dominant	Dominant	Controls enormous share of global trade	Core of global industrial economy

Trade exposes a particularly important difference between industrial power and commercial dependence. China's enormous exports reflect the extraordinary external reach of its manufacturing system, while its imports simultaneously reveal the enormous quantity of energy, materials, components and technology required to sustain that system. The EU is deeply embedded in international trade, but its enormous internal market provides a partial buffer against external shocks. The United States imports on an exceptional scale because its consumers and firms command enormous purchasing power, while its exports increasingly concentrate in sophisticated goods, services and intellectual-property-intensive activities. India remains less export-dominant than China, but its trajectory is more important than its current position because manufacturing and services are expanding together. Russia's export position is powerful but much more concentrated, making its trade strength simultaneously an asset and a vulnerability. A country exporting enormous quantities of commodities is not equivalent to a country controlling the technologies, components and machinery required by the entire production chain.The strategic question is therefore who controls the bottlenecks of global production, not merely who records the largest customs value.

5.Manufacturing market position

Economy	2023 global manufacturing value-added share	Relative position

China	31.8%	Global manufacturing leader
United States	15.0%	Second major manufacturing power
India	3.2%	Major emerging manufacturing power
Russia	1.3%	Significant but concentrated manufacturing base
EU	Requires EU-member aggregation	Major global manufacturing bloc

The 31.8% figure is the elephant in the room: China's manufacturing system is not merely large; it is structurally enormous relative to the rest of the world. At 15%, the United States retains a manufacturing base that is far too large to characterize it as a post-industrial economy in any serious sense. India's 3.2% is modest beside China but significant given its enormous population and comparatively lower level of industrialization.Russia's 1.3% demonstrates why its industrial influence cannot be inferred from manufacturing share alone. Energy, raw materials, nuclear technology and defence capabilities give Russia strategic leverage that manufacturing-value-added statistics do not fully capture. The EU cannot simply be compared with individual countries without first aggregating its member states, otherwise its industrial weight is artificially fragmented. The trajectory is also crucial: China's share rose dramatically over the past three decades, demonstrating that manufacturing geography can change on a historic scale.The central question for the future is whether India can reproduce enough of that transformation while the United States and EU attempt to preserve high-value production against China's enormous economies of scale.

6. Sectoral Pentarchy comparison

Industry	**EU**	**USA**	**China**	**India**	**Russia**
Agriculture & food	Strong	Strong	Very strong	Very strong	Strong
Mining	Limited	Strong	Strong	Medium	Very strong
Oil & gas	Low	Very strong	Medium	Medium	Very strong
Chemicals	Very strong	Very strong	Very strong	Strong	Strong
Pharmaceuticals	Very strong	Very strong	Strong	Very strong	Medium

Steel & metals	Strong	Strong	Very strong	Strong	Very strong
Machinery	Very strong	Very strong	Very strong	Strong	Strong
Automotive	Very strong	Strong	Very strong	Strong	Medium
Electronics	Strong	Very strong technology position	Very strong	Rapidly developing	Medium
Semiconductors	Strong equipment position	Very strong technology position	Very strong and expanding	Rapidly developing	Limited
Batteries	Strong	Strong	Very strong	Rapidly developing	Medium
Solar equipment	Strong	Strong	Very strong	Rapidly developing	Limited
Aerospace	Very strong	Very strong	Strong	Developing	Strong
Defence	Very strong	Very strong	Very strong	Strong and expanding	Very strong
Shipbuilding	Medium	Low	Very strong	Growing	Strong
Textiles & apparel	Medium	Low	Very strong	Very strong	Medium
IT & software	Strong	Very strong	Strong	Very strong	Medium
Telecommunications	Strong	Very strong	Very strong	Strong	Strong
Financial services	Very strong	Very strong	Very strong	Strong	Medium
Construction	Strong	Strong	Very strong	Very strong	Strong
Energy equipment	Very strong	Very strong	Very strong	Strong	Strong
Nuclear technology	Strong	Very strong	Strong	Strong	Very strong
Renewable technology	Very strong	Very strong	Very strong	Rapidly expanding	Medium

This sectoral table makes clear that the Pentarchy's competition is industry-specific rather than economy-wide. China is formidable wherever scale, manufacturing density and supply-chain integration matter, particularly in electronics, machinery, batteries, solar equipment, shipbuilding and vehicles. The United States remains exceptionally powerful where software, advanced semiconductors, aerospace, pharmaceuticals, finance and intellectual property determine competitive advantage. The EU's greatest strength lies in sophisticated industrial ecosystems in which engineering, suppliers, research institutions and specialized manufacturers reinforce one

another.

India has fewer areas of absolute dominance today but possesses unusually strong positions in pharmaceuticals, IT, textiles, food and an expanding automotive and electronics base.Russia's industrial strength is concentrated rather than broad, but its concentration in nuclear, defence, energy and raw materials makes those sectors strategically consequential.The striking feature is that almost every major strategic industry contains at least two Pentarchy competitors, creating overlapping rather than isolated spheres of power.The future industrial order will therefore be determined by which economies control the critical technologies and inputs at the intersection of these sectors.

7.Industrial specialization

Economy	Primary industrial advantage	Secondary advantage	Structural weakness
EU	Advanced diversified manufacturing	High-value engineering, chemicals, automotive	Energy costs, institutional fragmentation
USA	Technology and high-value production	Aerospace, energy, pharmaceuticals, software	Lower mass-manufacturing scale than China
China	Manufacturing scale	Electronics, machinery, batteries, EVs, solar	Dependence on some advanced technologies/imported inputs
India	Labour scale + services	Pharmaceuticals, IT, automotive, engineering	Lower average manufacturing productivity
Russia	Natural resources + strategic industries	Energy, metals, nuclear, defence	Industrial diversification and export concentration

The EU's problem is not lack of industrial capability but the difficulty of converting many national champions into a single coherent industrial strategy.

The United States possesses perhaps the strongest combination of technology, capital and entrepreneurship, but it cannot reproduce China's enormous manufacturing density simply through financial power. China's extraordinary scale gives it advantages that competitors cannot easily manufacture overnight, particularly supplier density and accumulated production knowledge. India's opportunity is almost the inverse: its labour and market scale are enormous, while its industrial productivity still has substantial room to rise. Russia possesses resources that other Pentarchy members would struggle to reproduce domestically, giving it strategic bargaining power even where its manufacturing base is smaller. The weakness of China's model is dependence on particular external technologies and markets, while the weakness of America's model is its relative loss of some mass-production capacity. The EU's vulnerability is fragmentation, India's is productivity, and Russia's is concentration. Each therefore possesses an obvious industrial advantage and an equally obvious structural Achilles' heel.

8. Growth dimension

Economy	Current industrial growth profile	Long-term potential	Main driver
EU	Low–medium	Medium	Advanced manufacturing and green transition
USA	Medium	High	Technology, AI, energy, advanced manufacturing
China	Medium–high	High	Automation, electrification, advanced manufacturing
India	High	Very high	Industrialisation, infrastructure, demographics
Russia	Medium	Medium	Resources, defence and strategic manufacturing

India stands out because its industrial story is still fundamentally a catch-up and expansion story, unlike the EU's mature industrial structure.China remains capable of substantial growth because it is moving from labour-intensive manufacturing toward automation, electrification and technologically sophisticated production.The United States has a different advantage: frontier technologies can generate large productivity gains without requiring proportional increases in employment. The EU's growth challenge is harder because it already operates near the technological frontier in many sectors and therefore must extract growth from innovation, efficiency and new industries. Russia's growth potential is more constrained by the concentration of its industrial structure and by its dependence on resource-intensive activities.

India therefore has the greatest arithmetic room for industrial expansion, but room for growth is not the same thing as guaranteed success. China has already demonstrated the ability to transform industrial scale into global market share, making its future trajectory more consequential than India's current numbers alone suggest. The contest is ultimately between maturity, technological frontier, scale expansion and resource concentration, with each Pentarchy member occupying a different point on that spectrum.

9. Global market-share power

Economy	Scale	Export power	Value-added power	Technology power	Resource power
EU	★★★★★	★★★★★	★★★★★	★★★★★	★★★
USA	★★★★★	★★★★	★★★★★	★★★★★	★★★★

China	★★★★★	★★★★★	★★★★★	★★★★	★★★
India	★★★★	★★★	★★★	★★★★	★★★
Russia	★★★	★★★	★★	★★★	★★★★★

The stars should not be interpreted as a single league table because industrial power is multidimensional. China's five-star scale, exports and value-added power reflect the sheer depth of its manufacturing ecosystem. The United States scores exceptionally well in technology and value creation because its most important advantages often sit at the high end of the value chain. The EU's five-star profile reflects the unusual combination of export capacity, advanced manufacturing, technological capabilities and economic breadth. India's weaker current export and value-added scores conceal a much stronger growth trajectory than the static stars suggest. Russia's five-star resource position is the clearest example of why industrial power cannot be reduced to manufacturing alone. A country controlling indispensable energy, minerals or nuclear capa-bilities can exercise strategic influence disproportionate to its manufacturing market share. The correct interpretation is therefore portfolio power: the economy with the most strategically important combination of capabilities may matter more than the economy with the largest single number.

10. The Pentarchy as a combined industrial system

Dimension	**EU**	**USA**	**China**	**India**	**Russia**
Population / labour scale	High	High	Very high	Very high	Medium
Consumer market	Very high	Very high	Very high	Very high	High
Manufacturing	Very high	Very high	Highest	High	Medium
Technology	Very high	Highest	Very high	High	High in selected sectors
Natural resources	Medium	High	Medium–high	Medium	Highest
Energy production	Medium	Very high	High	Medium	Very high
Capital markets	Very high	Highest	Very high	High	Medium
Industrial exports	Very high	High	Highest	Medium	High
Industrial diversification	Very high	Very high	Very high	High	Medium

Growth potential	Medium	High	High	Highest	Medium
Strategic autonomy	High	Very high	Very high	Rising	High
Overall industrial power	Very high	Very high	Highest	High / rising	High in strategic sectors

This final table shows why the Pentarchy is a more useful analytical concept than a simple ranking of national GDP. China possesses the greatest combination of population, manufacturing scale, exports and industrial supply-chain depth. The United States combines enormous capital markets with frontier technology, energy production, advanced industry and extraordinary corporate power. The EU possesses perhaps the most diversified high-end industrial ecosystem, although its political and fiscal fragmentation prevents that capacity from behaving exactly like a single national industrial system.India combines enormous labour and consumer-market potential with a rapidly expanding industrial base, making it the most obvious long-term challenger from a lower starting point. Russia lacks the aggregate economic scale of the other four but retains strategic capabilities in energy, resources, nuclear technology, metals and defence that make it impossible to treat as an ordinary middle-ranking economy.The decisive competition is therefore not simply China versus America, but a five-way contest over manufacturing scale, technological control, capital, resources, markets and supply chains.Taken together, these five economies constitute the overwhelming core of the world's industrial, technological, financial and resource power, and the central strategic question is which of them can convert its particular advantages into durable control over the next generation of global production.

When comparing the EU with the other major industrial powers, I would recommend using the **Pentarchy master cross-tab** as the starting point, followed by the nine complementary dimensions.

The purpose is not simply to rank the EU, US, China, India and Russia, but to identify **different sources of industrial power**: economic scale, employment, productivity, trade, manufacturing capacity, specialisation, growth, technology, resources and global market share.

Most importantly, the comparison should distinguish **domestic added value** from gross output: an industry may have high production but capture relatively little value domestically if critical technologies, components, intellectual property or capital are controlled elsewhere.

The **Pentarchy master cross-tab** establishes the overall position of each economy across the principal indicators.

Economic scale shows the capacity to sustain large markets, investment and industrial ecosystems.

Employment versus productivity reveals whether industrial strength comes mainly from labour scale or from high value added and productivity per worker.

Trade position identifies sectors in which economies have demonstrated international competitiveness and where they remain dependent on imports.

Manufacturing market position measures the ability to generate and retain industrial value at global scale.

Sectoral Pentarchy comparison then identifies which industries are dominated by China, the US, the EU, India or Russia and where the EU retains credible competitive positions.

Industrial specialisation is particularly important for the EU because European strength is distributed across different Member States rather than concentrated in a single national economy.

The growth dimension identifies whether existing strengths are expanding, stagnating or declining and where emerging opportunities could develop into future industrial advantages.

Global market-share power tests whether European firms have sufficient scale to compete with Chinese and US firms rather than merely being technologically competent or regionally strong.

Finally, **the Pentarchy as a combined industrial system** allows the EU to be assessed not simply as a collection of

Member States but as a potentially integrated industrial power.

The strategic question therefore becomes: **where can the EU combine domestic added value, technological capability, industrial scale, productivity and global market share sufficiently to take on China and the US?**

This approach also prevents "spread fencing": rather than supporting every sector and institution, EU policy can concentrate resources on the **specific value chains where European capabilities can generate high domestic value added and global competitive power**.

In that sense, the framework is not just descriptive; it provides a basis for deciding **where the EU should fight, where it should cooperate, and where it should not try to compete**.

The EU should use the Pentarchy framework to identify the industrial value chains in which it can realistically achieve global competitiveness and retain a significant share of domestic value added. Rather than spreading public support across a large number of programmes, sectors and institutions, policy should concentrate resources on a limited number of strategic capabilities where Europe has strong technological and industrial foundations, substantial market opportunities and the potential to scale globally. The objective should be to close critical gaps in technology, investment, energy, skills and supply chains, while converting European research, savings and market scale into competitive European production and firms. The comparison with the US, China, India and Russia should therefore serve not simply to rank industrial strength, but to determine where Europe should compete, where it should cooperate, where it should reduce dependencies, and where it should deliberately not try to compete.

Figure



Summary

The implications for the EU can be summarized as follows. The EU remains one of the world's major industrial powers, with exceptional strengths in advanced manufacturing, machinery, chemicals, pharmaceuticals, automotive, aerospace, energy technology and high-end engineering. However, its position is increasingly squeezed between the United States, which leads in many frontier technologies, capital markets and high-productivity activities, and China, which possesses unmatched manufacturing scale, supply-chain density and export capacity. India represents a different but increasingly important challenge because of its combination of population, labour supply, market growth and industrialisation potential, while Russia retains strategic leverage through energy, raw materials, nuclear technology, metals and defence.

The central European problem is therefore not insufficient economic size, but insufficient conversion of economic size into industrial power. The EU has a huge Single Market, substantial household savings, world-class universities and research institutions, sophisticated industrial companies and a highly skilled workforce, yet European firms often struggle to scale across national borders and to convert technological research into globally dominant companies. This creates a paradox in which Europe can be technologically excellent without necessarily capturing the corresponding commercial value.

Energy is one of the most immediate vulnerabilities. High European electricity and gas prices place particular pressure on chemicals, metals, materials, glass, paper and other energy-intensive industries. If this persists, the EU risks becoming increasingly dependent on imports of products that it once manufactured domestically. The green transition therefore needs to be treated not simply as an environmental programme but as an industrial strategy: Europe needs to manufacture the batteries, grids, turbines, transformers, heat pumps, power electronics, industrial equipment and other technologies required for decarbonisation rather than merely importing them.

China creates the most complicated competitive challenge. Europe is simultaneously dependent on Chinese manufacturing capacity, an important market for European companies and a competitor in automobiles, machinery, chemicals, batteries, renewable technologies and electronics. The objective should therefore not be indiscriminate economic separation, which would be extremely costly, but selective de-risking in technologies, materials and supply chains where excessive dependence

could create strategic vulnerability.

The United States presents a different challenge. Europe remains highly competitive in many physical industries, but the United States has enormous advantages in software, artificial intelligence, digital platforms, semiconductors, venture capital, aerospace, biotechnology and other high-value activities. The danger is that European companies continue to manufacture sophisticated products while an increasing proportion of the underlying digital, financial and technological value is captured elsewhere.

India should be viewed less as an immediate threat and more as the next major industrial competitor and potential strategic partner. Its manufacturing base is still substantially smaller than China's, but its enormous labour force, expanding domestic market, pharmaceutical capabilities, IT sector and infrastructure investment provide considerable room for growth. European firms therefore have an opportunity to establish deeper industrial relationships with India before its industrial capacity reaches a much larger scale.

Russia demonstrates another important lesson: industrial power cannot be measured solely through manufacturing value added. Russia's overall manufacturing share is far smaller than China's or America's, yet its energy, minerals, nuclear technology, metals and defence industries give it strategic influence well beyond its aggregate economic size. For the EU, this reinforces the importance of securing diversified supplies of energy and critical raw materials.

Ultimately, the EU needs to pursue strategic industrial competitiveness rather than simply economic efficiency. It cannot realistically dominate every sector, nor should it attempt to reproduce China's manufacturing model or America's technology ecosystem wholesale. Its strongest strategy is to concentrate on areas where European capabilities are already exceptional—advanced machinery, chemicals, pharmaceuticals, aerospace, automotive, robotics, defence, energy systems, industrial software, advanced materials and clean technologies—while aggressively improving productivity and technological commercialisation.

The decisive issue is therefore scale. Europe already possesses a market large enough to support globally competitive companies, but regulatory fragmentation, national barriers, insufficient risk capital and uneven investment prevent the Single Market from producing its full industrial effect. If European companies could scale across the entire EU as easily as American companies scale across the United States, Europe's industrial position would be considerably stronger.

The implications for strategic autonomy are significant. The Pentarchy framework suggests that **strategic autonomy is no longer determined by GDP alone, but by the ability to control critical technologies, capital, energy, resources, manufacturing capacity and supply chains**. China's manufacturing depth, the United States' technological and financial power, the EU's diversified industrial base, India's expanding scale and Russia's strategic resource and defence capabilities each provide different forms of autonomy.

This means that **control over dependencies becomes as important as control over domestic production**. An economy may be wealthy yet strategically vulnerable if it relies heavily on external suppliers for semiconductors, energy, critical minerals, advanced machinery or key technologies. Conversely, control of strategically important inputs can give a state influence far beyond its aggregate economic size.

The central implication is therefore that **strategic autonomy is relative and sector-specific**. No member of the Pentarchy is completely self-sufficient. Each possesses strengths that can be converted into leverage over the others, while remaining dependent on external capabilities in other domains. The resulting competition is less about achieving complete economic independence than about **securing control over the critical nodes of global production and reducing exposure to coercive dependencies**.

For the EU in particular, this highlights the importance of converting its existing industrial and technological strengths into greater collective capacity for action. Fragmentation can limit the strategic value of its economic scale. For India, the priority is to transform its large labour and consumer base into deeper manufacturing and technological capabilities. For the United States and China, maintaining technological and industrial leadership becomes central to preserving strategic leverage. Russia demonstrates that **selective control of strategically vital resources and technologies can compensate, to some extent, for weaker aggregate economic scale**.

Ultimately, the Pentarchy points toward a world in which strategic autonomy is measured by the capacity to withstand disruption, deny critical dependencies and retain freedom of action. The decisive struggle is therefore not simply over who has the largest economy, but over who controls the critical technologies, production **networks, resources and supply chains on which the others depend**.

In strategic terms, the EU should aim to transform

European market scale into corporate scale, European research into commercial technology, European savings into productive investment, and the green transition into European manufacturing capacity. If it succeeds, the EU can remain one of the three or four decisive industrial centres of the world. If it fails, the danger is not sudden deindustrialisation but something more subtle: Europe remaining wealthy, sophisticated and technologically capable while gradually losing the ability to determine where the highest-value parts of global production actually take place.

The EU's problem is not that it is too small. It is that it is not extracting enough power from its existing scale.

China's advantage is scale + manufacturing density. America's advantage is technology + capital + productivity. India's advantage is demography + growth + market scale. Russia's advantage is resources + strategic industries. The EU's potential advantage is market scale + advanced industry + technology + human capital + regulatory power.

The danger is that the EU could remain rich but increasingly less competitive—excellent at producing sophisticated goods, but increasingly dependent on foreign energy, digital technologies, capital markets, critical inputs and mass-production ecosystems. The Commission's 2026 assessment similarly notes persistent high energy prices, insufficient R&D investment, weak venture capital relative to peers and elevated strategic dependencies.

The strategic objective should therefore be:

Turn European economic scale into European industrial scale, European research into European companies, European savings into European investment, and Europe's green transition into European production.

28.Excursion to Italy's and German industrial landscape

Germany's economic difficulties are best understood not as the sudden collapse of an industrial model, but as the erosion of a model whose previous advantages have become less reliable. After two years of recession, Germany returned to only 0.2% growth in 2025, and the European Commission expects merely 0.6% growth in 2026. (Economy and Finance) The German Council of Economic Experts likewise characterises the weakness as both cyclical and structural, pointing to declining competitiveness and demographic change. (Sachverständigenrat Wirtschaft) Industrial decline is therefore central to the story, but it is better understood as one element of a broader structural adjustment.

For decades, Germany prospered from an unusually successful combination of manufacturing excellence, cheap energy, export demand, technological specialisation and integration into global markets. Its Mittelstand companies occupied highly specialised positions in machinery, chemicals, automotive components, electrical equipment and industrial technologies. The country could therefore sell sophisticated manufactured goods abroad while importing relatively inexpensive energy and intermediate inputs. This arrangement produced high productivity, strong exports and substantial regional employment in industrial communities.

The first major disruption was the energy shock following Russia's invasion of Ukraine. Germany's historically important access to relatively inexpensive Russian gas had supported energy-intensive sectors such as chemicals, metals, glass, paper and other materials. The subsequent increase in energy costs damaged margins and encouraged some production to contract or relocate. The European Commission reports that production in Germany's energy-intensive industries fell by approximately 15% between late 2021 and early 2025. (Publications Office of the EU) The energy problem is consequently not simply about household bills; it affects the economic foundations of Germany's industrial value chains.

The second problem is China. China was once an enormous market for German machinery and automobiles, but it has increasingly become a formidable competitor in precisely those sectors in which Germany had traditionally excelled. German exports to China have weakened as Chinese firms have improved productivity, expanded domestic production and moved into higher-value manufacturing. The IMF identifies Chinese advances in competing sectors, including automobiles, as an important component of Germany's declining external performance. (IMF)

The automotive industry illustrates the difficulty particularly well. German manufacturers built their international strength around combustion-engine technology, premium engineering and global brands. The transition towards electric vehicles has changed the basis of competition, placing greater weight on batteries, software, electronics, digital platforms and manufacturing scale. Chinese producers have advanced rapidly in these areas, while European producers have faced the difficult task of transforming established production systems without destroying the advantages that made them successful.

Machinery provides an equally important example because it reveals that Germany's problem is broader than automobiles. German manufacturers of industrial

equipment depend heavily on global investment cycles, and weak domestic investment has compounded weaker foreign demand. IMF analysis finds that machinery and equipment production has fallen substantially since late 2022, reflecting weak investment, higher costs and declining demand for German capital goods. (IMF eLibrary) Germany therefore faces pressure not only in consumer-facing industries but also in the industrial machinery that historically constituted the backbone of its export model.

A third difficulty is that Germany has underinvested in the conditions required for a new industrial era. Infrastructure, digitalisation, energy networks, housing and administrative capacity have not always developed at the speed demanded by technological change. The problem is particularly serious because an industrial economy cannot remain competitive merely by preserving yesterday's factories. It must continuously invest in the infrastructure, skills and technologies that make tomorrow's factories possible.

Demography compounds this problem. Germany's ageing population means that even successful firms increasingly face shortages of skilled workers. The European Commission expects the labour force to shrink as the population ages. (Economy and Finance) An economy can therefore suffer from an unusual combination of weak investment and labour scarcity: it has fewer people available to produce, while simultaneously struggling to invest sufficiently in productivity-enhancing technologies.

The fiscal framework has also mattered, although it should not be treated as the sole explanation. Germany's constitutional debt brake constrained public borrowing at precisely the moment when large investments in infrastructure, energy systems and defence became more urgent. The subsequent reform of the fiscal framework has created greater room for public investment, but rebuilding infrastructure after years of underinvestment takes time. The European Commission expects public spending to provide an important support to growth, but also stresses that private investment is recovering only gradually.

There is therefore a deeper question about the German economic model itself. Germany was exceptionally successful when globalisation rewarded specialised manufacturing, when China was primarily a customer rather than a competitor, and when energy was relatively inexpensive. The world has changed faster than the model. The difficulty is not that German industry has suddenly become incompetent, but that some of the assumptions under which its competence generated extraordinary returns are no longer valid.

This distinction matters politically because industrial decline has consequences beyond GDP. Manufacturing provides relatively well-paid employment, supports regional supplier networks and gives workers a visible connection between national prosperity and economic production. When factories close or production moves abroad, people do not experience the event as an abstract change in comparative advantage. They experience it as a loss of status, security and confidence in the future.

This is where the German economic story connects to the broader European political problem. Industrial decline can generate a perception that economic decisions are being made elsewhere and that national governments have lost the capacity to protect productive communities. Such perceptions can become fertile ground for populism, even when the underlying causes are technological and global rather than specifically European.

The Italian case is particularly revealing, although the relationship between industrial decline and Euroscepticism must be treated carefully. Italy remains a major manufacturing economy, with substantial capabilities in machinery, pharmaceuticals, food, luxury goods, automotive components and specialised production. Yet it has suffered from very weak productivity growth, inadequate investment and persistent regional disparities. Recent reporting continues to identify low productivity, weak innovation and high energy costs as important structural problems. (Le Monde.fr)

Italy's difficulty is therefore not simply that it has lost industry. Rather, it has struggled to renew and upgrade its industrial base at sufficient speed. Some traditional industrial districts remain highly competitive, while others have experienced foreign takeovers, restructuring or decline. The experience of industrial towns such as Fabriano illustrates how global competition, technological change, weak investment and rising costs can gradually undermine local productive ecosystems. (Financial Times)

This matters for Euroscepticism because the European project is often judged through the economic experiences of particular regions rather than through aggregate European statistics. A citizen who experiences stagnant wages, factory closures, precarious employment and declining local investment may reasonably ask what the European economy has delivered. The answer may involve national policy failures, globalisation, technological change and weak domestic investment as much as EU policy. Yet politically, these causes can become compressed into a simpler accusation against "Brussels".

The euro itself can intensify this perception. Italy entered monetary union with a productivity problem that it could no longer address through periodic currency depreciation. Before the euro, a loss of competitiveness could eventually be accompanied by a weaker currency, although such adjustments carried their own costs. Within the euro, adjustment occurs through changes in wages, productivity, investment and employment, which can be politically more painful and slower.

It would nevertheless be misleading to conclude that the euro caused Italy's industrial difficulties. Many of Italy's structural problems predate monetary union, including low productivity growth, bureaucratic weaknesses, demographic pressures, regional inequality, insufficient investment and the persistence of relatively small firms that often struggle to scale. The euro may have constrained certain adjustment mechanisms, but it did not create these underlying weaknesses.

The same caution applies to the European Union more generally. Industrial decline cannot simply be attributed to European integration. European integration also created the Single Market, expanded export opportunities, facilitated cross-border investment and provided a large market in which German and Italian firms could specialise. The EU has therefore been simultaneously a source of competitive pressure and an institutional framework for competitiveness.

The political difficulty arises when the benefits and costs of integration are distributed unevenly. A highly competitive industrial region can gain enormously from open markets, while a declining industrial town may experience global competition principally as factory closures. Aggregate GDP can therefore improve while particular communities become convinced that the economic system is working against them.

This helps explain why Euroscepticism is often strongest where economic insecurity becomes politically concentrated. The relationship is not mechanical: people do not become Eurosceptic simply because a factory closes. But industrial decline can weaken trust in established institutions, and that creates an opening for political movements that attribute economic disappointment to European integration, immigration, globalisation or national elites.

In Italy, this political dynamic has been particularly pronounced because European integration became associated with fiscal constraints, economic stagnation and a sense that national policy autonomy had diminished. Yet Euroscepticism has also been driven by migration, political dissatisfaction, corruption, regional inequality and broader distrust of political institutions. Industrial decline should therefore be treated as one important component of a larger political economy of discontent, rather than as a single cause.

Germany presents a somewhat different political problem. Its industrial model historically generated such strong prosperity that citizens came to regard economic success almost as a natural condition. When that prosperity becomes less secure, the psychological adjustment can be surprisingly severe. A society accustomed to being an industrial champion can experience relative decline more painfully than a society that has long expected economic uncertainty.

The emergence of China as an industrial competitor is particularly destabilising because it challenges Germany at the level of productive competence. Germany cannot easily respond by competing purely on low wages, because that would undermine its social model. Nor can it simply retreat into premium products, because Chinese companies are increasingly capable of producing sophisticated goods at scale. Germany therefore needs a new competitive proposition based on technology, productivity, automation, energy security and industrial innovation.

The wider European challenge is similar. Europe cannot simultaneously demand rapid decarbonisation, maintain high industrial employment, preserve extensive social protections and compete globally without making very large investments in productivity. The green transition therefore needs to be treated not merely as an environmental programme but as an industrial transformation.

This is particularly important because industrial decline can become self-reinforcing. Lower investment reduces productivity; lower productivity weakens competitiveness; weaker competitiveness reduces investment; and declining investment makes it harder to finance the technological transition. Once this cycle becomes established, political frustration naturally increases.

Breaking the cycle requires more than subsidies. Governments must create the conditions in which firms can invest profitably in new production. That means reliable energy, modern infrastructure, skilled labour, access to capital, effective research systems and sufficiently large markets. Industrial policy must therefore address the entire ecosystem rather than merely attempting to preserve individual companies.

Germany's present predicament also demonstrates why

Europe needs a more strategic approach to industrial competition. The United States has captured enormous value in digital platforms and frontier technologies, while China has captured extraordinary manufacturing scale. Europe possesses world-class engineering and industrial knowledge, but it has struggled to translate those capabilities into equivalent technological and financial scale.

The danger is that Europe becomes excellent at designing machines that others manufacture, regulating technologies that others commercialise, and importing the energy and components required to operate its industrial system. That would preserve an appearance of sophistication while gradually weakening the productive foundations beneath it.

The appropriate response is not protectionism in its crudest form. Germany and Italy depend heavily on international trade, and their industrial success has historically depended on openness. The challenge is to combine openness with strategic diversification and domestic capability in sectors where dependence would create serious vulnerability.

For Germany, this means rebuilding competitiveness in machinery, chemicals, automotive technologies, electrical equipment, energy systems and advanced manufacturing while accelerating its capabilities in software, AI, batteries and other emerging technologies. For Italy, the challenge is equally one of upgrading: strengthening productivity, scaling successful firms, modernising infrastructure and connecting industrial districts more effectively to new technologies and international markets.

The political lesson is perhaps the most important. Economic integration remains politically sustainable only when citizens believe that they have a meaningful stake in the prosperity it produces. If European integration is perceived as facilitating competition while national communities absorb the costs, Euroscepticism will remain politically attractive.

The answer is not to blame Europe for every factory closure, just as it is not credible to blame globalisation for every national economic failure. A mature industrial policy must distinguish between problems created by European institutions, problems created by national governments, and problems arising from technological and geopolitical changes that neither can completely control.

For Germany, the present weakness should therefore be interpreted as a warning that its old industrial bargain cannot simply be restored. Cheap energy, Chinese demand and combustion-engine dominance are unlikely to return in their previous form. The country must instead construct a new industrial model around productive investment, technological upgrading, affordable clean energy, automation, skills and diversified international partnerships.

For Italy, the corresponding lesson is that Euroscepticism cannot be addressed solely through political argument. If citizens experience persistent productivity stagnation, weak investment and declining industrial opportunity, appeals to European solidarity will have limited credibility. Restoring productive capacity is therefore also a means of restoring confidence in European integration.

The broader European implication is that industrial policy has become political policy. Competitiveness determines employment, regional prosperity and fiscal capacity; these in turn shape citizens' attitudes towards institutions and political integration. Industrial decline therefore matters not only because it lowers output, but because it can weaken the social foundations on which political cooperation rests.

Germany and Italy consequently illustrate two sides of the same European problem. Germany demonstrates the danger of allowing a successful industrial model to become too dependent on yesterday's comparative advantages, while Italy demonstrates the political consequences of failing to renew productivity and industrial capabilities over a prolonged period.

Neither case supports a simple anti-European conclusion. Indeed, the opposite may be true: the scale required to compete with the United States and China increasingly makes European cooperation more necessary. But European cooperation must become capable of producing visible industrial capabilities, investment and opportunities, rather than being experienced primarily through rules and constraints.

The ultimate challenge is therefore to reconnect European integration with productive capacity. If Europe can combine its Single Market with cheaper and cleaner energy, deeper capital markets, stronger innovation systems, strategic supply chains and greater industrial scale, it can turn integration into an instrument of renewal rather than a symbol of decline.

In this sense, the German slowdown and Italian Euroscepticism point towards the same fundamental lesson: Europe's political cohesion depends partly upon its industrial capacity to give citizens a credible economic future. Industrial policy is consequently not merely about factories, exports or GDP; it is about maintaining the economic foundations upon which social confidence, democratic legitimacy and European cooperation

ultimately depend.

The map shows that the geography of European industrialisation is highly uneven. Germany is the strongest industrial centre, shown by the darkest blue, reflecting its large manufacturing base in industries such as automobiles, machinery, chemicals and engineering. Russia also has a very high absolute value of industrial output, although its size and economic structure make direct comparisons with other European countries more difficult. France, Italy and the United Kingdom form other major industrial centres, while Spain, Poland, Turkey and the Nordic countries have substantial but generally smaller industrial economies. Much of Eastern and Southeastern Europe, including Romania, Bulgaria, Serbia and the Balkan states, has a lower absolute value of industrial production.

The geography of industrialisation has, however, been undergoing significant change. In the past, industrialisation was strongly concentrated in the traditional industrial core of Britain, Germany, northern France, Belgium and the Netherlands. Heavy industries developed around coalfields, ports, rivers, transport networks and major urban markets.

Today, industrial activity is more geographically dispersed. Although Western Europe's traditional industrial regions remain important, manufacturing has increasingly expanded towards Southern and Eastern Europe. Countries such as Poland, Czechia, Slovakia, Hungary and Romania have attracted manufacturing investment because of their skilled labour, lower production costs, improving infrastructure and integration into European supply chains.

This geography is likely to continue changing in the future. Traditional industrial regions may experience further deindustrialisation as older coal, steel and heavy-manufacturing industries decline, while high-technology industries such as aerospace, pharmaceuticals, electronics, robotics and advanced machinery become more important. The transition towards green energy is also likely to create new industrial centres based around electric vehicles, batteries, renewable energy, hydrogen and other low-carbon technologies.

Therefore, the map illustrates a transition from a relatively concentrated industrial core towards a more complex and dispersed industrial geography. Germany and other Western European countries remain major industrial centres, but Central and Eastern Europe are becoming increasingly important. In the future, the location of industry is likely to depend less on traditional factors such as coal and more on technology, skilled labour, renewable energy, infrastructure, supply-chain resilience and proximity to markets.

Furthermore, the implications of this changing geography are significant. The shift of industrial activity towards Central and Eastern Europe can contribute to economic growth, job creation and regional development, helping to reduce the economic gap between Western and Eastern Europe. However, it may also increase competition between regions and place pressure on traditional industrial areas that are losing manufacturing employment.

Another important implication is the increasing importance of infrastructure and investment. Countries that can provide efficient transport networks, reliable energy supplies, skilled workers and modern digital infrastructure are more likely to attract new industries. This could lead to the emergence of new industrial corridors and clusters, particularly around major cities and transport routes.

There are also environmental implications. The decline of coal and heavy industry could reduce pollution and greenhouse-gas emissions, but the growth of manufacturing may increase demand for energy and raw materials. The development of electric vehicles, batteries, renewable energy and hydrogen therefore creates an opportunity for Europe to combine industrial competitiveness with the transition to a low-carbon economy.

Finally, this changing geography has important implications for European economic resilience. Recent disruptions to global supply chains have encouraged companies to locate production closer to European markets and diversify their suppliers. As a result, Central and Eastern European countries could become increasingly important parts of European manufacturing supply chains. Overall, Europe's industrial geography is likely to become more polycentric, with several major industrial centres rather than one dominant traditional core.

29.The Industry Society and Urban Planning

The litterature on the relationship between industry, society and urban planning is long-standing and substantial.Lewis Mumford's *The City in History* provides one of the broadest historical accounts, interpreting the city as an expression of changing economic, technological and social organisation. Mumford is particularly valuable because he connects industrialisation with the transformation of urban form rather than treating the city merely as a physical container for economic activity. His analysis is historically ambitious, although reviewers have

noted that its breadth sometimes comes at the expense of analytical precision. Jane Jacobs offers a different perspective in *The Economy of Cities*, placing innovation, economic diversity and urban interaction at the centre of economic development. Her argument is particularly relevant to contemporary industrial policy because it suggests that cities generate economic growth through dense networks of firms, skills and knowledge. Jacobs therefore challenges planning approaches that separate economic production too rigidly from everyday urban life. Her work also provides an important bridge between urban planning and the economics of agglomeration.

Peter Hall's *Cities of Tomorrow* provides perhaps the clearest historical account of how changing social and economic problems produced successive planning doctrines. Hall demonstrates that planning has repeatedly responded to industrialisation, technological change, housing problems, transport and changing patterns of employment. The importance of Hall's work lies in showing that planning ideas are historically contingent rather than permanent solutions to urban problems. Henri Lefebvre takes the argument further by treating space itself as socially and economically produced. His work emphasises production, everyday life, politics and culture as interconnected dimensions of urban development. This makes Lefebvre particularly useful for understanding how industrial restructuring can alter not merely employment but the social geography of cities. Manuel Castells subsequently shifted attention towards networks, information and the changing organisation of urban economies. His work helps explain why contemporary production increasingly operates through networks extending beyond the boundaries of individual cities. David Harvey adds a political-economy perspective by examining how capital investment shapes urbanisation and how cities become arenas for accumulation, restructuring and inequality. Together, these authors demonstrate that industrial change and urban change are mutually constitutive processes. The decline of an industrial sector can therefore reshape employment, housing, land values, infrastructure, migration and political identities. Conversely, the quality of a city's infrastructure, skills, institutions and built environment can influence whether industries remain competitive or relocate elsewhere.

The decline of an industrial sector can therefore reshape employment, housing, land values, infrastructure, migration and political identities. Conversely, the quality of a city's infrastructure, skills, institutions and built environment can influence whether industries remain competitive or relocate elsewhere. This literature provides a strong foundation for understanding Industry 5.0 as more than a technological transformation. Industry 5.0 can be interpreted as the next stage in a much longer relationship between production, technology, society and urban space. Its implications for planning therefore concern not only factories and technology, but also housing, skills, mobility, energy, innovation ecosystems and social inclusion. The central lesson from this literature is that industrial policy and urban planning should not be treated as separate domains. The city is part of the productive system itself, providing the human, infrastructural and institutional conditions upon which industrial competitiveness depends.

This literature provides a strong foundation for understanding Industry 5.0 as more than a technological transformation. Industry 5.0 can be interpreted as the next stage in a much longer relationship between production, technology, society and urban space. Its implications for planning therefore concern not only factories and technology, but also housing, skills, mobility, energy, innovation ecosystems and social inclusion. The central lesson from this literature is that industrial policy and urban planning should not be treated as separate domains. The city is part of the productive system itself, providing the human, infrastructural and institutional conditions upon which industrial competitiveness depends.

Industry 5.0 also changes the scale at which industrial planning must operate, because production networks increasingly extend across the metropolitan region rather than remaining within a single industrial estate. Urban planners should therefore coordinate industrial land, housing, transport, energy and research policy across municipal boundaries. This requires stronger metropolitan governance, particularly where workers live in one municipality and production is concentrated in another.

The location of advanced industry should be assessed in relation to commuting patterns, housing affordability and access to skills, rather than simply land prices. This is important because highly productive industrial clusters can raise local housing costs and unintentionally exclude the workers they depend upon. Industry 5.0 therefore creates a stronger connection between industrial policy and housing policy.

Planning authorities should also anticipate the changing spatial requirements of robotics and automated production. Some factories may require less conventional labour space while demanding substantially greater access to electricity, data networks and specialised logistics. Industrial sites will consequently compete increasingly on the quality of their digital and energy infrastructure, not merely on physical accessibility. High-

capacity broadband, secure data systems and reliable electricity should become fundamental elements of industrial zoning. At the same time, planners should avoid creating entirely automated enclaves disconnected from surrounding communities.
Industry 5.0 places renewed emphasis on the social integration of production, including education, training, public space and community engagement.
Former industrial areas may therefore be regenerated as mixed innovation districts rather than converted entirely into residential developments.
Such regeneration can preserve industrial memory while creating new productive functions.

Urban planning should also protect space for small and medium-sized manufacturers, which can otherwise be displaced by higher-value commercial and residential uses. This is particularly important because industrial ecosystems depend upon networks of specialised suppliers, repair firms, laboratories and technical services.
The resilience of a city may therefore depend less on one large factory than on the diversity of its productive ecosystem. Industry 5.0 also creates opportunities to connect industrial policy with climate adaptation through green infrastructure, efficient water systems and resilient energy networks. The most successful industrial cities may consequently be those that combine productivity, environmental performance, social inclusion and strategic resilience. Urban planning becomes, in this sense, an essential instrument for ensuring that the transition to Industry 5.0 produces not merely smarter factories, but more resilient and economically capable cities.

Urban plan for an Industry 5.0 city

1. Overall vision

The city should be planned as a productive, green and human-centred metropolitan system in which advanced industry, housing, research, logistics and public services reinforce one another. The objective is not to separate industry from urban life, but to integrate clean and technologically advanced production into the city while protecting residents from unacceptable environmental impacts.

2. Spatial structure

Central city Housing, culture, government, services and knowledge institutions.

Innovation and research district Universities, laboratories, start-ups, technology companies and applied research centres located between the central city and industrial areas.

Advanced industrial districts Robotics, electronics, pharmaceuticals, biotechnology, advanced materials, clean manufacturing and precision engineering.

Green industrial belt Larger production facilities, energy infrastructure, recycling, circular-economy activities and activities requiring greater separation from residential areas.

Logistics and freight zone Rail freight, electric logistics, warehousing and distribution located close to major transport corridors rather than penetrating residential neighbourhoods.

Residential neighbourhoods Mixed-income housing located within reasonable distance of employment, schools, services and public transport.

3. Key urban connections

The most important feature should be connectivity between production and people.

University → research → start-up → factory → market

This productive chain should be supported by rapid public transport, cycling infrastructure, digital connectivity and freight infrastructure.

4. Industry 5.0 principles

The plan should prioritise human–machine collaboration rather than automation alone. Industrial areas should therefore include training centres, technical colleges and lifelong-learning facilities.

Industrial land should be protected from uncontrolled residential or commercial conversion so that productive capacity is not gradually pushed out of the city.

Energy planning should be integrated with industrial planning through renewable generation, storage, resilient electricity networks and, where appropriate, district heating.

Industrial waste should increasingly become a resource through industrial symbiosis, allowing firms to exchange heat, water and materials.

5. Housing and employment

New housing should be concentrated around public-transport corridors connecting major employment areas.

A deliberate mix of housing should prevent successful

industrial districts from becoming unaffordable for the workers who sustain them.

Industrial development should therefore be accompanied by housing, schools, healthcare and public transport, rather than allowing employment centres to become isolated zones.

6. Mobility

The city should operate through three complementary networks:

People: metro, tram, bus, cycling and walking.

Goods: rail freight, electric freight corridors and urban consolidation centres.

Digital infrastructure: high-capacity networks connecting factories, laboratories and services.

Heavy freight should be kept away from residential streets wherever possible.

7. Green and circular infrastructure

Every major industrial district should contain substantial green infrastructure, including trees, water management, biodiversity corridors and climate-adaptation measures.

Factories should be encouraged to share energy, water and waste streams.

Former industrial land should be remediated and reused wherever possible rather than continuously expanding the urban footprint.

8. Governance

The plan should be governed at the metropolitan level, because industrial supply chains, labour markets, housing and transport rarely respect municipal boundaries.

A permanent partnership should bring together municipalities, industry, universities, workers, residents and infrastructure providers.

9. Strategic purpose

The urban plan should ultimately produce a city that is productive without being polluted, technological without becoming socially divided, and industrial without sacrificing quality of life.

The central principle is:

Put people, production, knowledge and infrastructure close enough to cooperate, but plan them carefully enough to remain compatible.

That is the spatial logic of an Industry 5.0 city: not the old industrial city rebuilt, but a metropolitan economy in which advanced production becomes an integrated part of urban resilience, prosperity and everyday life.

Figure

The plan works cohesively because it is built around a set of **interlocking spatial, economic, infrastructural and governance logics**, rather than functioning as a collection of separate zones connected after the fact. Each component reinforces the others, creating a system in which the location of activities, movement of people and goods, provision of housing, environmental infrastructure and governance are mutually dependent.

1. Proximity is graded, not binary

Rather than applying the conventional planning model of separating “industry” and “city” into isolated zones, the plan treats distance from the urban core as an **intensity gradient**. Housing, culture and governance occupy the core; research and applied innovation sit immediately beyond it; advanced manufacturing occupies the next layer; and the most land-intensive or higher-impact activities—energy infrastructure, recycling, logistics and large-scale production—are concentrated toward the outer belt.

This creates a **graduated relationship between compatible and conflicting uses**. Research remains close to talent, universities, finance and public institutions, while heavier industry gains greater separation from residential areas. Crucially, however, neither function is isolated. The transition is continuous rather than defined by hard boundaries, allowing knowledge, labour, capital and materials to move efficiently across the system.

2. The productive chain is a physical network, not a metaphor

The sequence **“university → research → start-up → factory → market”** only becomes economically meaningful when the spatial structure allows these stages to interact rapidly. A researcher should be able to reach a start-up without a long cross-city journey, while a start-up should be able to move from prototyping to industrial production without encountering major logistical barriers.

For this reason, the innovation and advanced-

manufacturing districts are deliberately adjacent and connected by the same high-capacity transit spine that serves surrounding housing. **The economic pipeline and the mobility network therefore become mutually reinforcing infrastructure**: investment in connectivity improves access to jobs while simultaneously reducing the friction involved in moving ideas, skills, products and capital through the production system.

3. Three networks carry different loads

The plan deliberately separates three forms of movement: **people, goods and data**.

- People move through metro, tram, walking and cycling networks.
- Goods move through freight rail, logistics corridors and dedicated electric freight routes.
- Data moves through a resilient digital backbone.

This separation prevents competing uses from being forced onto the same infrastructure. Freight approaches industrial areas from the metropolitan edge rather than cutting through residential neighbourhoods, while passenger transit connects residential, research and employment nodes without being burdened by heavy logistics.

The result is an important planning principle: **industry does not have to be geographically remote to be socially compatible; it has to be connected through the right networks**. Separation is therefore achieved through infrastructure design rather than simply through distance.

4. Housing is distributed along the same connective tissue as employment

Housing is not treated as residual land left over after employment districts have been planned. Residential neighbourhoods are deliberately positioned around transit nodes that provide access to **research, advanced manufacturing, services and other employment sectors**.

This is particularly important for preventing the development of a high-skilled technology enclave. If housing is concentrated around research and innovation jobs alone, industrial and lower-income workers are progressively pushed toward the metropolitan periphery. Mixed-income housing distributed across multiple employment nodes instead keeps different parts of the labour force spatially connected to the industries the plan is intended to generate.

Housing therefore becomes **productive infrastructure**: it is part of the economic system because the availability, affordability and location of workers directly affects the viability of the industrial ecosystem.

5. The green belt is infrastructure, not scenery

The green belt performs several strategic functions simultaneously. First, it provides an **environmental buffer** between higher-impact industrial activities and surrounding urban districts. Second, it hosts elements of the energy and circular-economy system, including renewable generation, district heating, water systems, recycling and industrial symbiosis.

This enables one firm's waste stream to become another firm's resource—for example, waste heat, water or recovered materials can be captured and reused within the wider industrial system.

Third, the green belt functions as a **permanent spatial boundary** that protects industrial and infrastructure land from gradual conversion into residential or commercial development. Its role is therefore not simply aesthetic. It protects the long-term productive capacity of the metropolitan area while simultaneously providing biodiversity corridors, remediation capacity and climate-adaptation infrastructure.

6. Governance closes the loop

The spatial model cannot function effectively if it is implemented municipality by municipality. Labour markets, housing demand, freight corridors, infrastructure systems and environmental impacts operate at the metropolitan scale. A worker may live in one municipality, work in another and depend on infrastructure crossing several jurisdictions.

A metropolitan governance structure is therefore essential to maintain the coherence of the system. It provides the institutional mechanism for coordinating **industrial-land protection, transport investment, housing delivery, environmental standards and employment growth across administrative boundaries**.

In this sense, governance is not an additional layer placed on top of the plan. It is the mechanism that prevents the individual components from fragmenting over time.

Where the real tensions lie

The plan is coherent, but its most difficult coupling is between **proximity and environmental compatibility**. The model depends on keeping advanced industry close

enough to the city to benefit from labour, research and infrastructure while ensuring that industrial activity does not undermine the quality of nearby residential areas.

This cannot be solved through spatial separation alone. It depends on **technology and regulatory standards**. The industrial districts must genuinely consist of low-emission, low-noise and resource-efficient manufacturing. If conventional polluting industry is allowed to enter these areas, the environmental impacts could undermine housing demand and break the proximity-based economic model on which the plan depends.

A second tension concerns **affordability**. The same accessibility that makes these districts economically successful will make them attractive to investors and higher-income households. Over a 15–20 year period, rising land values could therefore displace the workers and households the plan is intended to serve. Mixed-income housing cannot be treated as a one-time planning designation; it requires permanent mechanisms such as inclusionary requirements, public or community land ownership, affordable-housing quotas and long-term land-value management.

Overall logic

The strength of the model is therefore that **each system solves a problem created by another system**: the spatial gradient manages proximity; the transit spine connects the productive chain; separate mobility networks manage externalities; distributed housing supplies labour; the green belt protects environmental and industrial capacity; and metropolitan governance prevents fragmentation.

The plan is consequently best understood not as a collection of districts, but as an **integrated urban-industrial ecosystem** in which spatial planning, economic development, infrastructure, housing, environmental management and governance are designed to operate as one system.

In Summary,

At first glance, the model may appear conventional: a central urban core, residential areas, an industrial belt and logistics concentrated around major transport corridors. This resemblance is deliberate. The innovation is not primarily in the physical geometry of the city, but in how these spaces are designed to function together as a single economic and urban system.

What distinguishes the model is the deliberate integration of activities that conventional planning tends to separate. Rather than treating universities, research centres, start-ups, factories, housing and markets as independent land uses connected mainly through commuting, the model links them into a continuous productive ecosystem: university → research → start-up → factory → market. The objective is to reduce the spatial and institutional friction between knowledge creation, innovation, production and consumption.

The difference therefore lies less in the appearance of the map than in the rules, infrastructure and institutions operating beneath it. Industrial land is protected from gradual conversion into higher-value residential or commercial uses, ensuring that productive capacity is not displaced by rising land values. Industrial districts are designed around principles of industrial symbiosis, allowing firms to exchange energy, water, waste and materials rather than operating as isolated sites. Housing provision is directly linked to employment growth, ensuring that the creation of new industrial and technological jobs is accompanied by sufficient and affordable housing for the workforce.

The model also operates at the metropolitan rather than purely municipal scale, recognising that labour markets, transport systems, housing demand and industrial supply chains extend beyond administrative boundaries. At the same time, training and skills infrastructure is embedded within the productive system itself, allowing workers to continuously adapt to advanced manufacturing, automation and human–machine collaboration.

The model should therefore not be judged by whether its map looks radically different from a conventional twentieth-century city. Its innovation is functional and institutional rather than purely morphological. The physical structure provides the framework, but the real transformation lies in connecting housing, research, industry, infrastructure, skills, environmental systems and governance into one mutually reinforcing ecosystem. In this sense, the proposal is not a new zoning pattern so much as a new operating model for the industrial city.

So the urban design is not “a smarter factory.”-standard. It is “a city designed to function as a smarter production system.”

This produces several concrete differences. Industry 5.0 asks how humans can work better with machines; your model asks how workers, machines, universities, factories and housing can be physically organised so that they reinforce one another. Industry 5.0 asks how an individual factory can become more resilient; your model asks how the entire industrial ecosystem can continue operating when a supplier, energy source or logistics route is

disrupted. Industry 5.0 promotes sustainable production; your model embeds energy generation, recycling, industrial symbiosis and green infrastructure into the spatial structure of the industrial city. Industry 5.0 focuses on workforce adaptation; your model places training directly alongside the industries that require those skills, creating a continuous university–training–factory pipeline.

The most important difference is therefore scale. Industry 5.0 is primarily a technological and organisational paradigm for the next generation of production. Your proposal is a spatial and institutional paradigm for the next generation of industrial cities.

A concise way to state the distinction is:

Industry 5.0 makes the factory human-centred, sustainable and resilient. This model extends those principles to the city itself, making the entire urban-industrial ecosystem human-centred, sustainable, productive and resilient.

30. Building Factories, Infrastructure, Skills, and Supply Chains Faster in Europe and Its Near Abroad

If Europe wants to build factories, infrastructure, skills, and supply chains at a much faster pace, the central challenge is not a shortage of capital. Europe remains one of the world's wealthiest economic regions, with deep pools of savings, advanced technology, strong universities, and sophisticated industrial firms. The real constraint is the ability to coordinate action across multiple levels of government, regulatory systems, labor markets, and private actors. Delays emerge from fragmented decision-making, lengthy permitting processes, uncertain timelines, and the difficulty of aligning public and private investment.

A faster European industrial strategy would begin by changing how projects are approved. Rather than evaluating every factory, logistics hub, transmission line, or industrial facility as a unique case, governments could designate large industrial acceleration zones where environmental reviews, land-use planning, infrastructure provision, and regulatory clearances are largely completed in advance. Companies locating within these zones would then face a predictable and substantially shorter approval process. The objective would be to shift from approving individual projects one at a time to approving entire industrial districts and allowing investment to flow into them rapidly.

Europe would also benefit from a greater willingness to build infrastructure ahead of demand. Across much of the continent, transmission networks, ports, rail connections, energy infrastructure, and industrial sites are often expanded only after demand is clearly established. This approach minimizes the risk of overbuilding but frequently creates bottlenecks that slow economic growth. Many of the world's fastest-growing industrial regions have accepted some degree of excess capacity as the price of speed. If Europe wants to attract major manufacturing investment, it will increasingly need to ensure that power connections, transport links, and industrial land are available before investors arrive rather than years afterward.

Administrative complexity represents another major obstacle. Large industrial projects often require engagement with numerous authorities, agencies, and regulators, each with separate procedures, documentation requirements, and timelines. A more effective system would provide a single interface through which investors can manage the entire approval process. One lead authority, one digital platform, and one integrated timeline would dramatically reduce uncertainty and lower the transaction costs of investment.

The relationship between the European Union and its neighboring regions should also be viewed through an industrial lens. Europe's future competitiveness does not require every stage of production to take place within the Union itself. A more resilient model would integrate the Western Balkans, Ukraine, Moldova, Turkey, and parts of North Africa into broader European production networks. High-value manufacturing, advanced engineering, and research-intensive activities would remain concentrated within the EU, while selected labor-intensive or intermediate production stages could be distributed across nearby partner economies. This would create supply chains that are geographically close, politically aligned, and less vulnerable to disruption than those extending across multiple continents.

Skills policy should become more closely connected to actual industrial demand. Too often, workforce development begins with educational programs and only later considers whether jobs will exist. A more effective approach starts with investment projects. Governments and companies can identify future workforce requirements, estimate the number and type of workers needed, and then design training programs around those specific opportunities. Skills development becomes faster and more effective when it is linked directly to concrete employment pathways rather than broad forecasts.

Demand aggregation is another underused tool. Industrial expansion becomes easier when suppliers can see large and predictable future markets. Joint European procurement for strategic goods such as transformers,

grid equipment, batteries, rail systems, defense products, and clean-energy technologies could create the confidence needed for firms to expand production capacity. Long-term demand signals reduce investment risk and encourage companies to build facilities before shortages emerge.

Industrial policy should also focus on ecosystems rather than isolated projects. Factories are rarely successful on their own. They thrive when surrounded by suppliers, logistics providers, engineering firms, technical schools, testing facilities, and sources of finance. Europe would likely achieve better results by concentrating resources within a limited number of strategic industrial corridors and clusters than by dispersing investment evenly across all regions. Successful industrialization depends less on individual flagship projects than on dense networks of complementary capabilities.

Public capital can play an important role, not because private finance is unavailable, but because uncertainty often discourages investment. Businesses are frequently less concerned about raising money than about the possibility of regulatory delays, infrastructure bottlenecks, or policy changes. Public institutions can accelerate investment by reducing these risks through guarantees, co-financing arrangements, supplier credit programs, and support for enabling infrastructure. The most valuable contribution of public finance is often the absorption of uncertainty rather than the provision of capital itself.

A deeper and more integrated Single Market would further increase the speed of industrial development. Companies operating across Europe continue to encounter different permitting systems, administrative procedures, and implementation practices. Greater standardization would allow capital, technology, and expertise to move more freely across borders. The closer Europe comes to a genuinely unified industrial and regulatory environment, the faster investment decisions can be translated into physical projects.

Finally, Europe must be selective. Attempting to rebuild every supply chain or dominate every strategic industry would dilute resources and political attention. The most effective strategy is likely to focus on a limited number of sectors where resilience, competitiveness, and security are particularly important. Electricity infrastructure, semiconductors, batteries, defense production, industrial machinery, critical mineral processing, clean-energy technologies, and digital infrastructure are examples of areas where concentrated effort could generate outsized returns.

The fundamental challenge facing Europe is therefore not a lack of money, talent, or technology. It is the ability to organize collective action at scale. Faster permitting, pre-approved industrial zones, infrastructure built ahead of demand, integrated regional supply chains, targeted skills development, stronger industrial clusters, and greater regulatory harmonization would do more to accelerate industrial growth than additional subsidies alone. Europe already possesses many of the ingredients required for industrial renewal. The question is whether it can create institutions capable of deploying them with greater speed and coordination.

Indicative Industrial Cross-Tab: Sectors and Locations Across the EU and Near Abroad

Sector	Core R&D and Design	Advanced Manufacturing	Component Production	Raw Materials / Processing	Skills & Workforce Hub	Strategic Rationale
Semiconductors	Germany, France, Netherlands, Belgium	Germany, France, Italy	Poland, Czechia, Slovakia, Romania	Serbia, Ukraine	Poland, Romania	Concentrates high-value design in established ecosystems while scaling labor-intensive and supporting activities eastward.

Batteries	Germany, France, Sweden	Poland, Hungary, Slovakia	Romania, Czechia, Serbia	Finland, Sweden, Serbia, Ukraine	Poland, Hungary	Creates a European battery corridor linked to automotive production.
Electric Vehicles	Germany, France, Italy	Slovakia, Czechia, Hungary, Poland	Romania, Serbia, Morocco	Ukraine (steel), Serbia (metals)	Slovakia, Romania	Builds on existing automotive clusters and supplier networks.
Grid Equipment & Transformers	Germany, France	Poland, Romania, Turkey	Serbia, Bulgaria	Ukraine, Balkans	Romania, Bulgaria	Addresses one of Europe's largest infrastructure bottlenecks.
Defense Manufacturing	France, Germany, Italy, Sweden	Poland, Czechia, Romania	Slovakia, Serbia	Ukraine	Poland, Romania	Combines industrial depth with frontline demand and strategic resilience.
Rail Equipment	Germany, France, Spain	Poland, Czechia, Romania	Serbia, Turkey	Balkans	Poland	Supports European transport integration and export competitiveness.
Industrial Machinery	Germany, Italy	Poland, Czechia, Slovakia	Romania, Serbia	Ukraine	Czechia, Poland	Extends Europe's strongest industrial sector into lower-cost manufacturing regions.
Renewable Energy Equipment	Denmark, Germany, Spain	Poland, Romania, Turkey	Morocco, Serbia	Balkans, Ukraine	Romania, Turkey	Diversifies supply chains currently concentrated in Asia.
Data Centers & AI Infrastructure	Germany, France, Netherlands, Belgium	Poland, Spain, Nordics	Romania, Czechia	Nordics (power), Balkans	Poland	Aligns energy availability with digital infrastructure growth.

Critical Minerals Processing	Finland, Sweden	Poland, Romania	Serbia, Turkey	Ukraine, Serbia, Balkans	Romania	Reduces dependence on external mineral processing chains.
Aerospace	France, Germany, Italy	Poland, Romania	Czechia, Morocco	Turkey	Poland	Expands supplier depth around existing European champions.
Pharmaceuticals & Biotech	Belgium, Germany, France, Denmark	Ireland, Italy, Poland	Romania, Hungary	Ukraine	Poland	Combines research excellence with scalable manufacturing capacity.

A Greater European Industrial System

Europe should stop thinking of industrial capacity as something that must fit neatly within the borders of the European Union. The more powerful concept is a Greater European industrial system: a deeply integrated economic space extending from the Atlantic to the Black Sea and Central Asia, and from Scandinavia through the Mediterranean into North Africa.

The objective would not be economic autarky. It would be to create a sufficiently large, diversified, technologically advanced, and geographically proximate production system that Europe can build at scale, withstand external shocks, and remain globally competitive.

Germany, France, the Netherlands, and Belgium would remain the core of Europe's capital-intensive and knowledge-intensive economy. They would concentrate advanced engineering, industrial R&D, finance, corporate headquarters, semiconductor technologies, complex machinery, chemicals, pharmaceuticals, aerospace, and other activities where technological depth and accumulated industrial capabilities matter most. Their role would increasingly be to design, finance, engineer, coordinate, and integrate complex industrial systems rather than simply maximize the volume of physical production within their own borders.

Italy and Spain would form another major pillar of the system, combining deep manufacturing traditions with machinery, robotics, transport equipment, shipbuilding, aerospace, energy technologies, and specialized industrial districts. Italy in particular can serve as one of Europe's great producers of the machines that make other factories possible, while Spain's renewable-energy potential, ports, land availability, and position between Europe, Africa, and the Atlantic give it an increasingly important role in energy-intensive industry and Mediterranean logistics.

Poland should become one of the principal engines of Europe's next industrial expansion. Its scale, workforce, geographical position, logistics networks, manufacturing base, proximity to Germany, Baltic access, and strategic importance on Europe's eastern flank give it the potential to become a vast platform for automotive production, batteries, electronics, defense manufacturing, machinery, logistics, and industrial services. Rather than being viewed simply as a lower-cost manufacturing location, Poland could become one of the central production platforms of the entire European economy.

Czechia, Slovakia, and Hungary would deepen the Central European manufacturing belt. Their established automotive industries, engineering capabilities, skilled workforces, and proximity to Germany make them natural locations for precision manufacturing, electronics, industrial components, mobility technologies, and increasingly sophisticated supplier networks. Their future role should be to move steadily upward from assembly toward higher-value engineering, automation, component production, and industrial systems.

Romania could become the principal industrial and logistics growth platform on Europe's southeastern flank. Its combination of population, industrial capacity, energy

potential, Black Sea access, agricultural resources, and proximity to both Central Europe and Ukraine gives it an unusually broad strategic role. With sufficient infrastructure investment, Romania could become a major center for machinery, electronics, energy equipment, defense production, logistics, and resource-intensive manufacturing.

The Western Balkans should be treated not as Europe's peripheral neighborhood but as an emerging industrial hinterland. Serbia, Bosnia and Herzegovina, North Macedonia, Albania, Montenegro and others can provide increasingly sophisticated component manufacturing, metals processing, machinery, automotive suppliers, electrical equipment, construction materials, and industrial services. Their integration into European supply chains would give companies additional capacity while creating a pathway for economic convergence and eventual deeper European integration.

Ukraine has the potential to become one of the most consequential industrial and resource regions of the wider European economy. Its steelmaking tradition, agricultural capacity, mineral resources, energy potential, engineering base, defense-industrial capabilities, and enormous reconstruction requirements create the possibility of a major industrial renaissance. Rebuilding Ukraine should therefore not mean merely restoring what existed before. It should mean connecting Ukrainian production directly into European value chains and using reconstruction to create modern steel, energy, engineering, defense, agricultural-processing, and mineral-processing industries.

Turkey occupies a uniquely important position. Its enormous manufacturing base, large workforce, automotive industry, machinery production, textiles, appliances, defense sector, ports, and geographical position make it far more than a neighboring supplier. Turkey can function as Europe's southern industrial bridge to the Caucasus, Central Asia, the Middle East, and the Mediterranean. A deeper European-Turkish industrial relationship could substantially expand Europe's manufacturing capacity while giving Turkey a larger role in European supply-chain resilience.

Morocco should become one of Europe's principal nearshoring platforms. Its proximity to Spain, access to both Atlantic and Mediterranean shipping routes, growing automotive and aerospace industries, renewable-energy potential, and competitive manufacturing base make it particularly well positioned for European-oriented production. Morocco can absorb the labor-intensive and medium-value stages of supply chains that Europe wants geographically closer without requiring every activity to be located inside the EU.

The wider North African region can extend this model. Tunisia can specialize in electronics, wiring, medical devices, machinery components, and other skilled manufacturing activities. Egypt can provide scale in chemicals, fertilizers, metals, energy-intensive industries, shipbuilding, food processing, and logistics. Together with Morocco, these economies could form a southern manufacturing belt increasingly integrated with European ports, energy systems, industrial standards, and supply chains.

The Nordic countries provide a different but equally important foundation. Their competitive advantage lies in abundant renewable and low-carbon energy, hydropower, minerals, forests, advanced engineering, maritime industries, digital infrastructure, and highly educated workforces. The Nordic region can therefore become one of Europe's major sources of clean industrial energy, critical minerals, green metals, batteries, advanced materials, data-center capacity, and energy-intensive production.

Beyond these immediate industrial partners lies a wider resource and connectivity belt extending through the Caucasus and Central Asia. Georgia can serve as a logistics and transit bridge between the Black Sea and Central Asia. Armenia brings engineering and technology capabilities. Azerbaijan contributes energy and transport connectivity. Kazakhstan offers enormous mineral and energy resources, while Uzbekistan and other Central Asian economies provide growing manufacturing capacity, labor, and access to strategically important raw materials. These regions do not need to replicate Western European industrial structures; their value lies precisely in complementing them.

The resulting system would resemble a vast industrial network rather than a conventional political bloc. Western Europe would provide capital, technology, design, advanced engineering, management, and high-value industrial systems. Central and Eastern Europe would provide enormous manufacturing depth and skilled industrial labor. The Balkans would expand the supplier base. Ukraine would contribute resources, heavy industry, energy, agriculture, and defense capabilities. Turkey would provide industrial scale and a bridge into neighboring markets. North Africa would provide competitive nearshore manufacturing, energy, and access to African markets. The Nordics would supply energy, minerals, advanced materials, and frontier technologies. The Caucasus and Central Asia would extend the system toward critical resources and new trade corridors.

The crucial point is that these regions should not simply trade with one another. They should produce together.

A battery-powered truck assembled in Poland could use battery cells manufactured in Slovakia from minerals processed in Finland and sourced through wider European supply networks. Its power electronics could be engineered in Germany, semiconductors supplied through Dutch and Belgian technology ecosystems, software developed in Belgium or the United Kingdom, specialized machinery produced in Italy, steel supplied by Ukraine, electrical components manufactured in Romania and Serbia, and wiring systems assembled in Morocco. The vehicle could then move through European logistics networks and be exported through ports on the North Sea or Mediterranean.

The same logic could apply to almost every strategic industry: defense, aerospace, railways, grid equipment, batteries, pharmaceuticals, machinery, electronics, renewable energy, chemicals, and industrial construction.

The purpose is therefore not to put every factory inside the EU. It is to make the wider European economic space function as one industrial machine: with shared standards, interoperable infrastructure, integrated energy networks, coordinated investment, common skills programs, predictable customs arrangements, and long-term industrial demand.

By 2040, the strategic objective should be a European production system extending from the Atlantic and Arctic to the Black Sea, Caucasus and Central Asia, and from the British Isles and Scandinavia through Central Europe and the Mediterranean into North Africa. Such a system would combine the capital and technology of Western Europe with the manufacturing scale of Central and Eastern Europe, the resources and reconstruction potential of Ukraine, the industrial depth of Turkey, the energy and minerals of the Nordics, the nearshoring capacity of North Africa, and the resource corridors of the wider Eurasian neighborhood.

That is a more credible route to European strategic autonomy than attempting to manufacture everything domestically. Europe's strength should come from integration at continental scale: not every country making everything, but every region making what it is exceptionally well placed to make, and the entire system connected tightly enough that the resulting industrial capacity behaves as one.

Toward an EU Near Shoring Industrial System

Region	Primary Role	Strategic Function in Industrial System
Germany, France, Netherlands, Belgium	Capital-intensive industry, advanced engineering, R&D, finance, headquarters functions	The command centers of the industrial system, concentrating innovation, design, advanced manufacturing, financing, and systems integration.
United Kingdom	Research, finance, aerospace, AI, life sciences	A leading source of frontier technologies, scientific research, advanced defense capabilities, and capital markets.
Italy	Industrial machinery, robotics, advanced manufacturing, industrial districts	Europe's workshop for specialized machinery, automation, and high-value manufacturing equipment.

Spain & Portugal	Renewable energy, logistics, maritime industries	The Atlantic and Mediterranean gateway for energy, transport, and industrial exports.
Poland	Large-scale manufacturing, logistics, workforce development, defense production	The principal industrial expansion platform of Europe and the natural anchor of the continent's eastward economic growth.
Czechia, Slovakia, Hungary	Precision manufacturing, automotive production, engineering	Highly productive industrial ecosystems supporting advanced manufacturing and export-oriented production.
Romania	Energy, manufacturing, logistics, digital infrastructure	The emerging industrial powerhouse of the Black Sea region and a major bridge between Central Europe and the wider neighborhood.
Bulgaria	Logistics, energy transit, industrial manufacturing	A strategic connector between European markets, the Black Sea, and the Eastern Mediterranean.
Western Balkans	Component manufacturing, metals, supplier industries, industrial labor	An integrated supplier base capable of absorbing production growth and supporting industrial scaling.
Ukraine	Steel, critical minerals, energy, agriculture, defense manufacturing	Europe's largest future source of industrial raw materials, strategic resources, and reconstruction-driven growth.
Turkey	Large-scale manufacturing, machinery, logistics, defense industries	The indispensable bridge linking Europe, the Middle East, the Caucasus, and Central Asia.
Nordics	Green energy, critical minerals, advanced	The resource and energy foundation of a low-carbon industrial economy.

	technology, data infrastructure	
Morocco	Automotive, aerospace suppliers, industrial assembly	Europe's most important nearshore manufacturing platform in North Africa.
Tunisia	Electronics, medical devices, industrial components	A skilled manufacturing partner for medium-value industrial production.
Egypt	Chemicals, fertilizers, shipbuilding, energy-intensive industries	A major industrial and logistics node connecting Europe to Africa and the Middle East.
Caucasus (Georgia, Armenia, Azerbaijan)	Transit infrastructure, engineering talent, energy resources	The gateway linking Europe to Central Asian markets and resources.
Central Asia (Kazakhstan, Uzbekistan and partners)	Critical minerals, metals, energy, industrial inputs	A strategic resource hinterland supporting Europe's long-term industrial security.

A Possible 2040 Vision

By 2040, Europe could operate not merely as a collection of national economies but as a fully integrated industrial ecosystem stretching from the Atlantic Ocean to Central Asia and from Scandinavia to North Africa.

A battery-powered truck assembled in Poland might contain battery cells manufactured in Slovakia using lithium refined in Finland and nickel sourced through Kazakhstan. Its electric drive systems could be designed in Germany, powered by semiconductors fabricated in the Netherlands, and integrated with software developed in Belgium and the United Kingdom. Steel and critical metals could arrive from Ukraine, while specialized robotics used on the production line might come from northern Italy. Electronic components could be produced in Romania and Serbia, with wiring systems assembled in Morocco and Tunisia. Final distribution would move through logistics corridors linking the North Sea, the Baltic, the Black Sea, and the Mediterranean.

A next-generation fighter aircraft might combine British avionics, French systems integration, German manufacturing, Italian propulsion technologies, Polish component production, Turkish aerospace capabilities, and Ukrainian materials. A new data center cluster could run on Nordic energy, use Dutch semiconductor technologies, draw on French and German industrial equipment, and be connected through infrastructure spanning multiple countries.

In this model, Europe's competitive advantage would not come from concentrating every stage of production within the borders of the EU. It would come from orchestrating a broader economic sphere in which different regions specialize according to their strengths while remaining deeply integrated through shared standards, infrastructure, finance, energy networks, digital systems, and supply chains.

The result would be a Greater European Industrial System of nearly one billion people: combining Western Europe's

capital and technology, Central Europe's manufacturing depth, Ukraine's resources, Turkey's industrial scale, British innovation, Nordic energy and minerals, North African production capacity, and Central Asian raw materials. Such a system would possess the scale to compete globally, the resilience to withstand geopolitical shocks, and the flexibility to accelerate industrial development far faster than the fragmented structures that exist today.

How could the constitutional provisions on industry policy evolve ?

1. Introduction: from industrial policy to external industrial competitiveness

The institutional order policy making is undertaken in the EU Industrial policy domain serves as a vessel in which symbolic, normative and operative aspects are molded – they do not merely regulate behaviour but also constitute the social world in which behaviour becomes meaningful. And it is this world we now have worked in, and proceed to work on in the following.

We recall, Article 173 TFEU occupies an unusual position in the constitutional architecture of the European Union. It expressly recognises the competitiveness of Union industry as an objective of Union and Member State action, yet it does not establish a comprehensive, autonomous Union competence covering industrial policy. Instead, Article 173 combines three different constitutional techniques: the coordination of Member State industrial policies, the adoption of limited supporting measures, and—most significantly—the mobilisation of other Treaty policies and activities in pursuit of industrial objectives.

This structure reflected an earlier conception of industrial competitiveness in which the principal determinants of competitiveness could be addressed through the internal market, research and innovation, competition, infrastructure and related domestic policies. The economic environment in which European industry now operates is substantially different. Industrial competitiveness increasingly depends upon access to foreign markets, secure supply chains, foreign investment, energy and critical raw materials, international infrastructure, technological partnerships, economic security and the capacity of European firms to compete against heavily subsidised or strategically supported competitors from third countries.

The constitutional question is therefore not simply whether the Union should acquire an entirely new power called “external industrial policy”. Rather, the more precise question is whether the Treaties should make explicit an external dimension that is already implicit in Article 173(3).

That provision is particularly important because it states that the Union shall contribute to the objectives of industrial competitiveness “through the policies and activities it pursues under other provisions of the Treaties.” This wording prevents Article 173 from being understood as an entirely self-contained policy field. Industrial objectives are constitutionally capable of being pursued through other Union policies.

The proposed reform should therefore preserve the logic of Article 173 while making explicit that the competitiveness of Union industry may require action beyond the Union's territorial and internal-market boundaries.

2. Detailed textual analysis of Article 173 TFEU

A. Paragraph 1: competitiveness is the constitutional objective

Article 173(1) begins with an important formulation:

“The Union and the Member States shall ensure that the conditions necessary for the competitiveness of the Union's industry exist.”

The provision does not merely refer to “industry”. It refers specifically to “the competitiveness of the Union's industry.”

This distinction is important. The constitutional objective is not simply the existence of industrial activity within the Union. It is the creation of conditions under which Union industry can remain competitive.

The provision then identifies four objectives:

1. adjustment to structural change;
2. an environment favourable to enterprise, particularly SMEs;
3. cooperation between undertakings; and
4. better exploitation of the industrial potential of innovation, research and technological development.

These objectives reveal that Article 173 was conceived as a horizontal industrial-policy provision. It does not prescribe a single instrument or sector. Instead, it identifies factors affecting industrial competitiveness.

This is precisely what makes the provision adaptable to contemporary conditions. If technological capacity, energy security, access to raw materials or foreign markets become determinants of competitiveness, the constitutional objective of Article 173 can logically interact with policies addressing those factors.

There is, however, an important constitutional limitation. Article 173(1) requires industrial action to occur "in accordance with a system of open and competitive markets." Industrial competitiveness therefore cannot simply become a justification for unrestricted protectionism.

A new Treaty provision should consequently distinguish strategic competitiveness from protectionism. The objective should be to strengthen the capacity of European industry to compete, innovate and withstand strategic dependencies, rather than to insulate European firms from competition.

B. Paragraph 2: coordination rather than centralisation

Article 173(2) establishes a second constitutional mechanism. Member States must consult one another in liaison with the Commission and, where necessary, coordinate their action. The Commission may facilitate this coordination through guidelines, indicators, exchanges of best practice, monitoring and evaluation.

The language is deliberately different from a classic harmonisation competence.

The Treaty therefore recognises that industrial policy has a multi-level character. Member States retain substantial responsibility, while the Union provides coordination and supporting action.

This becomes problematic, however, when industrial competitiveness depends upon policies that are necessarily external. A Member State may independently pursue investment screening, supply-chain diversification, strategic partnerships or industrial subsidies, but fragmented national approaches can weaken the Union's collective bargaining position and create internal competition between Member States.

The externalisation of industrial policy therefore creates a stronger case for Union-level coordination.

A revised provision should consequently require coordination not only of Member State industrial policies but, where relevant, their external economic and industrial actions.

C. Paragraph 3: the constitutional bridge

Paragraph 3 is the most important provision for your argument.

Its first sentence provides:

"The Union shall contribute to the achievement of the objectives set out in paragraph 1 through the policies and activities it pursues under other provisions of the Treaties."

The significance of this sentence is easily underestimated.

Article 173 does not say that industrial policy must be pursued exclusively through Title XVII. On the contrary, it expressly anticipates that the objectives of industrial competitiveness will be pursued through other Treaty policies and activities.

This produces a constitutional distinction between:

industrial policy as a policy field, and industrial competitiveness as a cross-cutting objective.

The latter can influence the application of other Union policies.

This provides a much stronger argument than saying that Article 173 itself creates an external industrial-policy competence.

It does not.

Rather, the argument should be:

Article 173(3) establishes a constitutional principle of policy integration: industrial competitiveness may be pursued through other Treaty competences. Because several of those competences have an inherently external dimension, the pursuit of Article 173 objectives necessarily extends, in appropriate circumstances, to external economic action.

This interpretation is also consistent with contemporary EU legislation. Recent Union instruments have expressly relied on Article 173(3), alongside other Treaty bases, to support industrial competitiveness in areas including critical technologies, clean and digital transition, health, biotechnology, space, security and defence.

The provision therefore already functions as a gateway between industrial policy and other policy fields.

What is missing is an explicit recognition that some of those policies operate internationally.

3. Why Article 173 is no longer sufficient on its own

The problem is not necessarily that Article 173 is legally obsolete. Its basic architecture remains useful.

The problem is that its wording was developed around a conception of competitiveness that insufficiently reflects contemporary geoeconomic interdependence.

European industrial competitiveness may now depend upon:

- access to critical raw materials located outside the Union;
- reliable international energy supplies;
- diversification of global supply chains;
- access to third-country markets;
- foreign direct investment;
- international technology cooperation;
- strategic infrastructure;
- international standards;
- economic-security partnerships;
- resilience against coercive economic measures; and
- reciprocity in international markets.

These are not purely internal-market questions.

Consequently, the constitutional boundary between "industrial policy" and "external economic policy" is increasingly artificial.

At the same time, the Treaties already contain extensive external competences, particularly in the Common Commercial Policy and the Union's external action. The question is therefore not whether the EU possesses *any* external economic powers. It clearly does.

The institutional problem is that industrial competitiveness is not expressly articulated as an objective guiding the external exercise of those powers.

That is where treaty reform could add genuine constitutional value.

4. The case for a new Treaty provision

I would not recommend simply inserting the words "external industrial policy" into Article 173.

That formulation could create unnecessary competence disputes:

Does the Union now possess a new autonomous competence?
Is it exclusive or shared?
How does it interact with the Common Commercial Policy?
Does it authorise industrial measures in third countries?
Does it permit harmonisation?

A better approach is to establish an external dimension of industrial competitiveness while preserving the existing distribution of competences.

The new provision should therefore do four things:

1. recognise the external determinants of industrial competitiveness;
2. require coherence between internal industrial policy and external economic action;
3. provide a basis for strategic partnerships and resilient supply chains;
4. expressly preserve the existing Treaty competences and institutional safeguards.

Article 173 — Union industrial policy

1. The Union and the Member States shall ensure the conditions necessary for the competitiveness, resilience and sustainable development of Union industry and shall strengthen the Union's industrial and technological capacity.

For that purpose, and in accordance with a system of open and competitive markets, their action shall aim to:

(a) promote the competitiveness and productivity of Union industry and accelerate its adaptation to structural, technological and economic change;

(b) foster an environment favourable to innovation, entrepreneurship and the development of undertakings throughout the Union, in particular small and medium-sized enterprises;

(c) promote cooperation and industrial integration between undertakings, research institutions and public authorities;

(d) strengthen the Union's capacity in strategic technologies, research, innovation and technological development;

(e) promote the development of secure, diversified and sustainable supply chains and reduce excessive strategic dependencies which may undermine the Union's industrial capacity;

(f) ensure access to the energy, raw materials, technologies, infrastructure, skills and markets necessary for the long-term competitiveness of Union industry;

(g) support the twin green and digital transitions while ensuring that they strengthen, rather than undermine, the Union's industrial capacity and technological sovereignty.

2. In pursuing the objectives of paragraph 1, the Union shall take into account the international dimension of industrial competitiveness.

The Union shall promote the conditions necessary for Union industry to compete fairly in international markets and shall seek to strengthen secure and diversified economic, technological, energy and industrial relations with third countries and international organisations.

The Union shall promote strategic industrial partnerships concerning, in particular, critical raw materials, energy, strategic technologies, research and innovation, infrastructure, investment, standards and resilient supply chains.

3. The Union shall contribute to the achievement of the objectives set out in paragraphs 1 and 2 through the policies and activities pursued under other provisions of the Treaties, including the internal market, common commercial policy, research and technological development, energy, transport, environment, digital policy, competition and external action.

The Union shall ensure coherence between those policies and Union industrial policy where they materially affect the competitiveness, resilience or strategic capacity of Union industry.

4. The Member States shall consult each other in liaison with the Commission and, where necessary, shall coordinate their industrial policies and measures affecting the international competitiveness, resilience or strategic capacity of Union industry.

The Commission may take any useful initiative to promote such coordination, including the establishment of common guidelines and indicators, the exchange of best practices, the monitoring of strategic dependencies and vulnerabilities, and the periodic evaluation of the Union's industrial capacity.

The European Parliament shall be fully informed.

5. The European Parliament and the Council, acting in accordance with the ordinary legislative procedure and after consulting the Economic and Social Committee and the Committee of the Regions, may adopt specific measures in support of action taken by the Member States and by the Union to achieve the objectives of this Article.

Such measures may include measures supporting strategic industrial projects, technological development, industrial cooperation, diversification of supply chains, access to strategic resources, international industrial partnerships and the internationalisation of Union enterprises.

Such measures shall not entail harmonisation of the laws and regulations of the Member States unless expressly authorised by another provision of the Treaties.

6. Measures adopted pursuant to this Article shall respect the principles of an open and competitive market economy, fair competition, proportionality and non-discrimination.

This Article shall not constitute a basis for measures whose principal purpose is to distort competition, introduce tax provisions, or regulate the rights and interests of employed persons, without prejudice to measures adopted on an appropriate legal basis elsewhere in the Treaties.

7. The exercise of the powers provided for in this Article shall be without prejudice to the competences conferred upon the Union by other provisions of the Treaties.

Where an action pursued under this Article falls within a specific Union competence, the substantive and procedural requirements applicable to that competence shall apply.

If you want one completely revised Article 173, rather than adding a new Article 173a, I would recommend replacing the existing provision with a more modern article that expressly incorporates competitiveness, resilience, strategic autonomy and the external dimension of industrial policy, while preserving the existing constitutional safeguards.

The current Article 173 is essentially centred on competitiveness, structural adjustment, SMEs, cooperation, innovation and coordination, and its paragraph 3 connects industrial objectives to other Treaty

policies.

In summary, EU industrial policy aims to strengthen European industry, competitiveness, innovation, and economic resilience. It also supports the green and digital transitions of European industries. The European Commission plays an important role by proposing legislation and developing industrial strategies. It also enforces competition and state-aid rules. The Council of the EU represents the interests of Member States in industrial-policy decisions. The European Parliament helps adopt legislation and approves the EU budget. The Single Market is important because it allows companies to operate and trade across EU Member States. Competition rules are designed to prevent companies and governments from unfairly distorting competition. State-aid rules limit how governments can financially support national companies. However, these rules have become more flexible for strategic sectors and major transitions.

This means that the EU wants to reduce dangerous dependencies on countries outside the EU. This is particularly important for areas such as semiconductors, energy, batteries, and critical raw materials. Economic security has become more important because global competition and geopolitical tensions have increased. EU industrial policy is therefore increasingly connected to geopolitical considerations. Traditionally, EU industrial policy focused more on markets, competition, and correcting market failures. Today, the EU increasingly seeks to actively shape the direction of European industry. Climate change has also made sustainability an important part of industrial policy. The EU therefore supports industries that can contribute to the green and digital transitions. This shows a shift from the EU mainly being a **market-maker** to also becoming a **market-shaper**. Overall, EU industrial policy combines economic competitiveness with strategic autonomy, sustainability, innovation, and economic security.

For **actors**, such as EU institutions, Member States, businesses, and interest groups, the changing EU industrial policy creates both opportunities and challenges. EU institutions have more influence over strategic sectors, technology, investment, and industrial regulation. Member States have to balance their national industrial interests with EU competition rules and the objectives of the Single Market. Businesses can benefit from EU funding, subsidies, and support for strategic industries, but they also face new regulations and sustainability requirements. Interest groups and industry associations have an important role in influencing EU policymaking and shaping how industrial priorities are defined. For **observers**, such as academics, analysts, and policymakers, EU industrial policy shows a broader transformation in the role of the EU. The EU is no longer simply focused on creating and regulating markets but is increasingly trying to shape markets and support specific strategic industries. This means that observers need to pay attention not only to formal EU powers but also to changing norms and ideas such as strategic autonomy, resilience, and economic security. Overall, the main implication is that EU industrial policy has become more political and strategic, making the relationship between EU institutions, Member States, and businesses increasingly important.

Proposed new Article 173 TFEU

Article 173 — Union industrial policy

1. The Union and the Member States shall ensure the conditions necessary for the competitiveness, resilience and sustainable development of Union industry and shall strengthen the Union's industrial and technological capacity.

For that purpose, and in accordance with a system of open and competitive markets, their action shall be pragmatic and aim to:

(a) promote the competitiveness and productivity of Union industry and accelerate its adaptation to structural, technological and economic change, including defence industrial RDI;

(b) foster an environment favourable to innovation, entrepreneurship and the development of undertakings throughout the Union, in particular small and medium-sized enterprises;

(c) promote cooperation and industrial integration between undertakings, research institutions and public authorities;

(d) strengthen the Union's capacity in strategic technologies, research, innovation and technological development;

(e) promote the development of secure, diversified and sustainable supply chains and reduce excessive strategic dependencies which may undermine the Union's industrial capacity;

(f) ensure access to the energy, raw materials, technologies, infrastructure, skills and markets necessary for the long-term competitiveness of Union industry;

(g) support the twin green and digital transitions while ensuring that they strengthen, rather than undermine, the

Union's industrial capacity and technological sovereignty.

(h) provide the conditions for growth in the European Union's GDP through a multi-dimensional, cross-sectoral and policy interoperable industrial strategy combing supranational powers and businesses with member states' strengths

2. In pursuing the objectives of paragraph 1, the Union shall take into account the international dimension of industrial competitiveness.

The Union shall promote the conditions necessary for Union industry to compete fairly in international markets and shall seek to strengthen secure and diversified economic, technological, energy and industrial relations with third countries and international organisations.

The Union shall promote strategic industrial partnerships concerning, in particular, critical raw materials, energy, strategic technologies, research and innovation, infrastructure, investment, standards and resilient supply chains.

3. The Union shall contribute to the achievement of the objectives set out in paragraphs 1 and 2 through the policies and activities pursued under other provisions of the Treaties, including the internal market, common commercial policy, research and technological development, energy, transport, environment, digital policy, competition and external action.

The Union shall ensure coherence between those policies and Union industrial policy where they materially affect the competitiveness, resilience or strategic capacity of Union industry.

4. The Member States shall consult each other in liaison with the Commission and, where necessary, shall coordinate their industrial policies and measures affecting the international competitiveness, resilience or strategic capacity of Union industry.

The Commission may take any useful initiative to promote such coordination, including the establishment of common guidelines and indicators, the exchange of best practices, the monitoring of strategic dependencies and vulnerabilities, and the periodic evaluation of the Union's industrial capacity.

The European Parliament shall be fully informed.

5. The European Parliament and the Council, acting in accordance with the ordinary legislative procedure and after consulting the Economic and Social Committee and the Committee of the Regions, may adopt specific measures in support of action taken by the Member States and by the Union to achieve the objectives of this Article.

Such measures may include measures supporting strategic industrial projects, technological development, industrial cooperation, diversification of supply chains, access to strategic resources, international industrial partnerships and the internationalisation of Union enterprises.

Such measures shall not entail harmonisation of the laws and regulations of the Member States unless expressly authorised by another provision of the Treaties.

6. Measures adopted pursuant to this Article shall respect the principles of an open and competitive market economy, fair competition, proportionality and non-discrimination.

This Article shall not constitute a basis for measures whose principal purpose is to distort competition, introduce tax provisions, or regulate the rights and interests of employed persons, without prejudice to measures adopted on an appropriate legal basis elsewhere in the Treaties.

7. The exercise of the powers provided for in this Article shall be without prejudice to the competences conferred upon the Union by other provisions of the Treaties.

Where an action pursued under this Article falls within a specific Union competence, the substantive and procedural requirements applicable to that competence shall apply.

Why I think this is stronger than the existing Article 173

The major change is that the first sentence now defines industrial policy much more broadly.

The existing Article 173 says that the Union and Member States should ensure the conditions necessary for "the competitiveness of the Union's industry." (EUR-Lex)

The proposed formulation adds:

"competitiveness, resilience and sustainable development"

and

"industrial and technological capacity."

That matters because competitiveness today cannot be understood simply as the ability to produce cheaply. A

European industry can be highly productive and nevertheless vulnerable if it depends entirely on one foreign source of energy, technology, raw materials or components.

The really important innovation is paragraph 2

This is where I would put the external industrial policy argument.

Instead of creating a separate "external industrial policy", the new Article 173 would expressly say:

"the Union shall take into account the international dimension of industrial competitiveness."

That is constitutionally cleaner.

It recognises that industrial competitiveness has an external dimension without necessarily creating a completely autonomous external competence.

This is particularly defensible because the existing Article 173 already says that the Union contributes to industrial objectives "through the policies and activities it pursues under other provisions of the Treaties." (EUR-Lex)

The new text would therefore turn the existing implicit logic into an explicit constitutional principle.

Paragraph 3 is the bridge

I would retain the existing logic of Article 173(3), but expand it.

The current provision already establishes that industrial objectives can be pursued through other Treaty policies. (EUR-Lex)

The revised provision would make clear that this includes, where relevant:

- common commercial policy;
- research and technological development;
- energy;
- transport;
- competition;
- digital policy; and
- defence industrial RDI
- external action.

This would establish industrial-policy coherence as a Treaty principle.

It would mean, for example, that EU trade policy cannot be designed entirely independently of the Union's industrial-capacity objectives.

Paragraph 4 creates a new coordination obligation

The current Article 173 requires Member States to consult and, where necessary, coordinate their industrial actions. (EUR-Lex)

The new wording expands this to measures affecting:

"the international competitiveness, resilience or strategic capacity of Union industry."

This is important because Member States increasingly have their own relationships with third countries concerning energy, investment, raw materials, technology and industrial cooperation.

The objective would not be to eliminate national industrial policy.

It would be to prevent national fragmentation from weakening European industrial capacity.

Paragraph 5 gives the provision practical force

The existing Article 173 permits Parliament and Council to adopt specific supporting measures but expressly excludes harmonisation. (EUR-Lex)

I would retain that architecture.

But the revised article should expressly identify possible measures concerning:

strategic industrial projects, technological development, diversification of supply chains, strategic resources and international industrial partnerships.

That gives the Treaty provision a much clearer operational dimension.

The central constitutional shift

Your paper could therefore present the reform as a transition:

Old Article 173

Industrial competitiveness → mainly internal framework conditions → coordination → support.

New Article 173

Industrial competitiveness + resilience + strategic capacity → internal and external determinants → policy coherence → coordination → strategic industrial action.

And this is important: I would not call the new provision "external industrial policy" in the Treaty itself.

I would call it:

"the external dimension of Union industrial policy."

That formulation is legally more cautious and academically stronger.

It avoids suggesting that Article 173 should replace the Common Commercial Policy or the Union's other external competences. Instead, it establishes industrial competitiveness as a cross-cutting objective that must inform the exercise of those existing competences.

That is also consistent with the European Parliament's description of industrial policy as cross-cutting and integrated with trade, research and innovation, environmental policy, defence and other Union policies. (European Parliament)

The core thesis for the Treaty reform

I would ultimately frame our proposal around this sentence:

The revised Article 173 should transform industrial competitiveness from a predominantly internal policy objective into a horizontal constitutional objective encompassing the Union's industrial, technological and strategic capacity, including the external economic conditions upon which that capacity depends.

This gives a much stronger basis for arguing that trade, energy, investment, critical raw materials, technology and international partnerships are not external to EU industrial policy; they are increasingly constitutive of industrial competitiveness itself.

31.RENVOI

The Industrial Power the EU Should Seek

The transformation of European industrial policy raises a question more important than the question of intervention itself: what kind of industrial power should Europe become?

The answer should not be sought in isolation from the character of the European economy. Europe does not possess every resource it requires, nor should it seek to produce everything within its borders. Its strength has always depended in part upon exchange, commerce, technology and cooperation with others. Yet an economy that depends upon others without possessing alternatives is exposed; an economy that possesses alternatives can choose.

The purpose of European industrial policy should therefore be clear: to give Europe the capacity to produce what is strategically necessary, to secure what it cannot produce itself, and to shape the external relationships upon which its prosperity depends.

This power rests upon five foundations.

First is productive power. Europe must maintain sufficient capacity in those industries upon which its economic security depends. It need not manufacture every product, but it must not become incapable of producing the things upon which its essential capabilities rest. Strategic production is therefore not merely a question of industrial output. It is a question of national and European capacity to act when circumstances change.

Second is technological power. No industrial power can remain strong if the technologies upon which its future depends are developed elsewhere and controlled by others. Semiconductors, advanced digital technologies, artificial intelligence, clean technologies and other critical capabilities increasingly determine both economic competitiveness and geopolitical influence. Europe must therefore possess the research, skills, capital and industrial ecosystems necessary to develop and retain technological capabilities of strategic importance.

Third is resilient power. Production is of little value if its foundations can be interrupted by a single disruption. Europe must therefore diversify its suppliers, routes, technologies and sources of strategic inputs. The purpose is not to eliminate dependence, which would be neither possible nor desirable, but to ensure that dependence does not become vulnerability and that vulnerability cannot become coercion.

Fourth is economic power. No strategic ambition can endure without a productive economy. Competitive enterprises, investment, infrastructure, finance, skills and access to international markets remain the foundations of European strength. Industrial policy must therefore strengthen the conditions under which European firms

can invest, innovate, expand and compete. Strategic intervention should reinforce competitiveness, not become its substitute.

Fifth is relational power. In an interconnected world, strength is also measured by the relationships a power is capable of building. Europe must therefore develop partnerships that provide access to resources, energy, technology, infrastructure and markets while creating reciprocal economic value. It should not merely respond to external dependencies; it should acquire the capacity to shape the networks of interdependence through which its economy operates.

These five forms of power cannot be separated. Productive power without technology creates dependence. Technology without investment cannot be sustained. Competitiveness without resilience remains vulnerable. Resilience without external relationships becomes unnecessarily costly. And external relationships without sufficient domestic capacity leave Europe with limited bargaining power.

The objective must therefore be integrated industrial power: a European capacity in which production, technology, competitiveness, resilience and external partnerships reinforce one another.

This is why European industrial strategy should not pursue self-sufficiency as an end in itself. Europe does not need to produce everything. It needs freedom of choice, policy-makers freedom of action.

It must be able to determine where it depends, how much it depends, and with whom it depends. Where a dependency is excessive, Europe should diversify. Where a capability is indispensable, it should develop sufficient capacity of its own. Where cooperation offers greater efficiency and mutual benefit, Europe should build durable partnerships.

This is the foundation of managed strategic interdependence.

Interdependence becomes a weakness not when Europe depends upon others, but when Europe has no alternative. Strategic strength therefore lies in maintaining sufficient alternatives to ensure that economic relationships remain relationships of choice rather than relationships of necessity.

Europe should not seek to need no one. It should seek to ensure that no single dependency can determine its choices.

This principle provides the foundation for External Strategic Industrial Policy. If Europe's industrial strength depends upon resources, technologies, energy, infrastructure, finance and markets beyond its borders, then the management of those relationships must become part of industrial strategy itself.

Trade policy, investment policy, energy policy, connectivity policy and external partnerships can no longer be treated as entirely separate from industrial policy when they determine the conditions under which European industry can produce and compete.

The implications are particularly important for Central Asia and Kazakhstan. Their importance to Europe should not be measured merely by the resources Europe can obtain from them. Their strategic value lies in the possibility of developing deeper industrial relationships involving processing, investment, infrastructure, energy, technology and connectivity.

The objective should therefore be greater than securing supplies. It should be to build industrial relationships that create capacity on both sides. European industry gains more diversified and resilient access to strategic inputs, while partner countries gain investment, technology, infrastructure and opportunities for higher-value production.

The same principle can apply to regional connectivity and institutions such as the Organisation of Turkic States. Europe's strategic interest is not simply in reaching Central Asian resources, but in helping to develop the infrastructure and networks through which those resources, technologies, energy and markets can become part of more resilient Eurasian value chains.

The European objective is consequently neither protectionism nor laissez-faire. It is strategic openness: remaining open to the world while possessing sufficient productive, technological and economic strength to determine the terms of that openness.

Europe should be capable within the global economy, rather than seeking to stand apart from it.

Its strength should be measured not by the number of dependencies it eliminates, but by the number of choices it preserves.

Not by whether it produces everything, but by whether it can produce what is essential.

Not by whether it withdraws from global markets, but by whether it can enter those markets from a position of capability.

And not by whether it avoids interdependence, but by whether it can shape and govern it.

Europe need not produce everything. It must possess the capacity to produce what is essential, the resilience to secure what it cannot produce, the technology to remain competitive, and the partnerships through which its prosperity can endure. That is not autarky. It is strategic industrial power.

Which industries will provide the best-paid jobs?

The highest-paid jobs are likely to concentrate around scarce expertise, rather than around the sectors employing the most people.

The strongest candidates are:

AI, advanced computing and software — AI researchers, machine-learning engineers, chip designers, cybersecurity specialists, quantitative specialists and senior software engineers.

Semiconductors — chip architects, process engineers, equipment engineers, materials scientists and specialised technicians.

Biotechnology and pharmaceuticals — computational biology, drug discovery, genomics, medical engineering and specialised research.

Advanced manufacturing and robotics — robotics engineers, automation specialists, industrial AI engineers and advanced manufacturing specialists.

Energy technology — power-system engineers, grid engineers, nuclear specialists, battery engineers and energy-system experts.

Defence and aerospace — systems engineers, aerospace engineers, cybersecurity specialists, AI specialists, propulsion engineers and advanced materials scientists.

Quantum and advanced technologies — smaller employment volumes, but potentially extremely high wages because the skills are exceptionally scarce.

The EU's 2026 human-capital recommendation identifies particularly large shortages in AI, cybersecurity, data analysis and semiconductor technologies. It estimates that the EU could need 6.2–7 million AI-related workers by 2027, alongside shortages of around 300,000 cybersecurity specialists and close to 100,000 semiconductor professionals under current trends.

But where will the *most* jobs be?

This is where the answer changes.

The biggest employment growth will probably not come from AI laboratories or semiconductor fabs. Healthcare, care, education, construction, energy installation, manufacturing, logistics and digitally transformed services will employ far more people.

The Commission expects the transition toward climate neutrality, if supported by appropriate policies, to create 1–2.5 million additional jobs by 2030, while the Net-Zero Industry Act estimates around 350,000 additional manufacturing jobs in net-zero industries. It also identifies around 4.2 million construction job openings by 2035, including replacement demand and new jobs.

This creates an important distinction:

AI may generate enormous GDP and productivity gains with relatively few direct jobs, while healthcare, construction and clean infrastructure may generate enormous employment with lower average productivity.

That is why a utility-per-euro-per-citizen criterion is important.

The European job hierarchy of tomorrow

I would therefore think about the future labour market in four layers.

The highest-paid jobs will be concentrated in AI, semiconductors, biotechnology, advanced engineering, finance, defence technology and frontier R&D.

The highest-productivity jobs will increasingly be in AI, advanced manufacturing, robotics, pharmaceuticals, energy technology and specialised professional services.

The largest number of new jobs will likely be in healthcare, care, education, construction, energy infrastructure, manufacturing, logistics and technology-enabled services.

The greatest social value per worker may come from healthcare, education, energy infrastructure and technologies that increase the productivity of essential services.

The most interesting sector is therefore AI combined with the rest of the economy. AI itself may not employ hundreds of millions of Europeans, but an AI-enabled European economy could make millions of existing workers more

productive. The Commission's latest employment analysis similarly finds that AI and emerging digital technologies are likely to increase overall employment in Europe, although the gains will be uneven and disproportionately favour higher-skilled workers unless policies support those more exposed to disruption.

32. The Reconfiguration of EU Industrial Policy, 2026–2040

The EU is not going to abandon industrial policy over the next five years. Instead, it will reconfigure it. The main change will be a move away from a model based primarily on regulation, competition and climate targets towards a more active industrial strategy focused on competitiveness, economic security, decarbonisation and strategic autonomy.

What will stop?

The EU is unlikely to completely end any major element of industrial policy. However, several approaches will become less important.

First, the idea that regulation and market competition alone can deliver European industrial competitiveness will weaken. The EU will increasingly intervene through investment, state aid, public procurement and trade policy.

Second, Europe will become less willing to depend entirely on global supply chains for strategically important goods. This change is already underway and will become stronger between 2026 and 2031.

Third, climate policy will no longer be treated as separate from industrial policy. Decarbonisation will increasingly be linked to the competitiveness and survival of European industry.

Finally, the EU will try to reduce unnecessary regulation and administrative costs. The aim is not to stop regulation, but to make it simpler and faster for businesses to invest and expand.

What will replace it?

The replacement will be a more selective and strategic form of industrial policy.

The EU will concentrate support on sectors considered important for Europe's economic and strategic security. These are likely to include semiconductors, artificial intelligence, batteries, critical raw materials, defence, clean technologies, energy infrastructure and other strategically important manufacturing activities.

For energy-intensive industries such as steel and chemicals, the objective will increasingly be to help companies decarbonise while keeping production in Europe rather than allowing production to move abroad.

The EU will also use public procurement, investment programmes and state aid to create stronger demand for European and low-carbon products.

Why is the EU making this change?

There are four main reasons.

The first is Europe's competitiveness problem. European companies face high energy costs, slower productivity growth and difficulties scaling new technologies.

The second is geopolitical uncertainty. Dependence on foreign suppliers is increasingly seen as an economic and security risk, particularly where critical technologies and raw materials are concerned.

The third is the cost of the green transition. Europe does not want to achieve its climate objectives by simply importing the technologies needed to achieve them. It wants to retain manufacturing capacity in Europe.

The fourth is the growing competition between major economic powers. The United States and China are using large-scale public support to strengthen strategic industries. Europe therefore faces pressure to become more active itself.

What are the constraints?

The EU cannot support every industry or protect every factory. Public money is limited, and excessive national subsidies could fragment the Single Market.

The EU therefore has to be selective. It must decide which industries are genuinely strategic and where public intervention can make a difference.

There is also a fundamental trade-off. Europe cannot simultaneously have the cheapest possible imports, completely open markets, rapid decarbonisation and domestic production of everything. Choices will have to be made.

What will change as a result?

By around 2031, industrial policy is likely to be much more closely connected to trade, energy, climate and security policy.

Companies in strategic sectors should expect more opportunities for public support, but also more conditions attached to that support. Public procurement and government investment may increasingly favour European or low-carbon production.

Businesses should also face faster permitting and efforts to reduce unnecessary administrative burdens.

Trade policy will become more strategic. The EU will still trade globally, but it will place greater emphasis on resilient and diversified supply chains rather than simply buying from the cheapest supplier.

Most importantly, climate policy will increasingly be viewed as an industrial strategy. The question will not only be how quickly Europe can reduce emissions, but also whether European companies can remain competitive while doing so.

The overall consequence

The central change is therefore not the end of EU industrial policy. It is its reorientation. The old approach was broadly based on competition, free trade, regulation and climate targets.

The emerging approach combines those elements with strategic investment, targeted state support, European demand, trade protection, economic security and industrial decarbonisation. The EU is effectively accepting a greater role for government in the economy in exchange for greater resilience, technological capacity and control over strategically important industries.

The main risk is that this develops into expensive protectionism and subsidy competition without improving European productivity. The opportunity is that the EU finally brings together industrial, climate, energy, trade and innovation policy into a coherent strategy for maintaining Europe's industrial base.

At the same time, in continuity and rupture with the path laid out by the founding fathers, the present order advances as if following an old map whose landmarks remain visible, even as the roads themselves have shifted beneath our feet; what persists is the aspiration to shape the world through economic and industrial power, while what changes is the geography of that power, dispersed across new networks of production, technology, capital, and strategic dependence.

The US-led model of globalisation, once presented as an almost irreversible horizon toward which the world was steadily moving, is now confronted by a more fragmented and contested landscape. The old architecture has not disappeared, but its foundations are being tested by the return of competing centres of economic and technological power. Globalisation, once imagined as the progressive convergence of markets, has become a field of rivalry in which trade routes, industrial capacities, supply chains, technologies, and strategic resources acquire the weight of geopolitical instruments. Competition has therefore become not only stiffer but also more diffuse: it takes place simultaneously in factories and financial markets, in ports and laboratories, in standards, platforms, and networks. What emerges is neither a simple retreat from globalisation nor its continuation in its previous form, but a new geography of interdependence, in which the same connections that once promised convergence can also become instruments of leverage, vulnerability, and indirect conflict.

In this changing landscape, the role of China and the European Union in sustaining the global capitalist system and preserving a rules-based multilateral trading order is likely to become increasingly important. Neither actor simply occupies the position once associated with the United States; rather, both are becoming central pillars in a more dispersed architecture of globalisation. China, through its industrial capacity, trade networks, investment, and expanding technological capabilities, has become deeply embedded in the functioning of the global economy. The European Union, meanwhile, continues to exercise influence through the scale of its single market, its regulatory power, and its commitment to multilateral institutions and rules-based trade. Their growing importance reflects a broader transformation: the preservation of global capitalism may increasingly depend not on the dominance of a single power, but on the capacity of several major centres to sustain economic interdependence while managing an intensifying competition for markets, technologies, resources, and strategic influence.

Alongside states and regional institutions, European multinational corporations (MNCs) have become increasingly important actors in this evolving system. Firms such as Siemens, ASML, Airbus, Schneider Electric, Bosch, and TotalEnergies illustrate the breadth of Europe’s industrial and technological capabilities. Their global operations connect European industry to markets, supply chains, technologies, capital, and investment networks across the world. In this sense, these corporations are not merely beneficiaries of globalisation but active participants in shaping its future. Their control over critical technologies, industrial know-how, infrastructure, and global production networks gives them a growing role in the geoeconomic competition between

major powers. At the same time, their strategies increasingly intersect with the European Union's ambitions for strategic autonomy, technological sovereignty, supply-chain resilience, and the defence of a rules-based multilateral trading system. European MNCs therefore occupy an increasingly important space between the economic interests of firms and the geopolitical objectives of states, helping to sustain global interdependence while simultaneously becoming instruments—and sometimes targets—of intensifying great-power competition.

Moreover, this evolving landscape is shaped not only by the interaction between states, international institutions, and multinational corporations, but also by multiple and overlapping levels of decision-making. Decisions taken at the national, European, regional, and corporate levels increasingly intersect, producing a complex architecture in which industrial policy, trade policy, investment strategies, and geopolitical considerations are closely intertwined. National governments pursue strategic interests, the European Union seeks to coordinate and regulate collective economic power, while MNCs make investment and production decisions according to global market conditions and strategic calculations. These different levels do not always move in the same direction; they can reinforce one another, but they can also generate tensions and competing priorities. The result is a form of geoeconomic competition in which power is exercised simultaneously through governments, institutions, firms, and networks, making the boundaries between economic and geopolitical decision-making increasingly difficult to distinguish.

33.Conclusions: From Strategic Autonomy to Strategic Interdependence

The analysis used the conceptual framework to examine how EU industrial policy has evolved from a predominantly market-regulatory approach towards a more strategic and interventionist model. The framework provided a structured way of tracing this transformation from **industrial vulnerabilities and strategic objectives through legal competences, policy instruments, institutional coordination, Member-State implementation and external partnerships**, ultimately linking these dimensions to changing industrial outcomes.

Applied to the research questions, the findings reveal that this transformation is neither linear nor complete. The EU has not abandoned its traditional commitment to competition, market integration and economic openness. Rather, strategic considerations have been layered onto these existing principles, producing a more complex policy mix in which regulation, market-based mechanisms, state support, public investment and strategic coordination increasingly coexist.

First, regarding the evolution from market regulation towards strategic intervention, the analysis demonstrates a gradual broadening of the EU's industrial policy role. Earlier approaches placed greater emphasis on ensuring competitive markets and preventing distortions, whereas more recent initiatives increasingly seek to influence the structure and direction of industrial development. This does not mean that market regulation has become irrelevant. Instead, regulation increasingly operates alongside measures designed to strengthen productive capacity, reduce vulnerabilities and support strategically important sectors. The shift is therefore better understood as an **expansion of the EU's industrial policy repertoire** rather than a complete replacement of the market-oriented model.

Second, economic security has transformed both the objectives and instruments of EU industrial policy. Competitiveness remains important, but it is increasingly interpreted through the additional objectives of resilience, security of supply, technological capability and strategic autonomy. This has broadened the definition of what constitutes a successful industrial policy. Efficiency and cost minimisation are no longer necessarily sufficient where excessive dependence may create strategic vulnerabilities. Consequently, instruments such as investment support, diversification measures, screening mechanisms, strategic stockpiling, supply-chain monitoring and support for domestic capabilities have gained greater relevance. Nevertheless, economic security does not automatically justify intervention in every sector. The emerging approach involves identifying particular dependencies and vulnerabilities and then calibrating intervention accordingly.

Third, dependence on critical resources, technologies and external supply chains has externalised European industrial strategy. Industrial resilience increasingly depends on developments beyond the EU's territorial and regulatory boundaries. Access to raw materials, energy, advanced technologies, manufacturing capacity and logistical networks can determine the resilience of European industries. This means that industrial policy can no longer be treated exclusively as an internal market issue. External dependencies have effectively transformed relationships with third countries into part of the EU's industrial policy environment. However, externalisation should not be interpreted simply as an attempt to eliminate dependencies. Given the EU's economic structure, many dependencies cannot realistically or

efficiently be removed. The more plausible objective is therefore to **reduce excessive concentration, diversify sources of supply and increase the EU's capacity to absorb disruptions**.

Fourth, trade, investment, connectivity and international partnerships are increasingly incorporated into EU industrial policy. These instruments traditionally belonged to different areas of EU external economic policy, but the analysis demonstrates increasing overlap between these policy domains and industrial objectives. Trade agreements can contribute to diversification of supply, investment policy can support strategic capabilities, connectivity initiatives can strengthen supply-chain resilience, and partnerships with third countries can provide access to resources, technologies and markets. Industrial strategy is consequently becoming more outward-looking. At the same time, this creates tensions because external economic engagement must balance industrial interests with the EU's broader commitments to openness, international cooperation and rules-based trade.

Fifth, the emerging framework represents a shift towards managed strategic interdependence rather than a straightforward retreat from economic openness. The evidence does not support a simple narrative in which the EU is moving from globalisation towards protectionism. European industries remain deeply integrated into international markets, and many strategic objectives can only be achieved through continued international cooperation. The transformation therefore concerns less the abandonment of interdependence than the **political management of its risks**. The central question is increasingly not whether the EU should be interdependent, but which dependencies are acceptable, which are vulnerable, and how they can be diversified or governed.

This also introduces an important tension within contemporary EU industrial policy. Measures designed to increase resilience may sometimes reduce short-term efficiency, while efforts to develop domestic capacity may increase costs or create tensions with competition principles and international trading partners. Similarly, strategic autonomy may require investment in capabilities that would not necessarily emerge from market incentives alone. The emerging policy model therefore involves a continual balancing of **efficiency against resilience, openness against security, and market competition against strategic intervention**.

The research consequently suggests that the transformation of EU industrial policy should not be understood as a decisive transition from one coherent model to another. Instead, it represents an **incremental layering of strategic objectives onto an existing market-oriented institutional framework**. This helps explain why contemporary EU industrial policy can appear simultaneously liberal and interventionist: market integration remains its structural foundation, while economic security increasingly shapes the conditions under which that market is governed.

The conceptual framework therefore served not only as a way of organising the analysis but also as a bridge between the **research questions and the empirical findings**. It demonstrated how vulnerabilities generate strategic objectives, how these objectives are translated into legal and policy instruments, how implementation depends on multi-level governance, and how external partnerships increasingly become part of the industrial strategy itself.

The question, then, is not simply what Europe should produce. It is what Europe must be capable of producing if it wishes to remain prosperous, innovative and free to choose its economic future.

Automotive. What would it mean to remain an automotive power if the car itself is transformed? Europe must lead the transition to electric, software-defined and autonomous mobility. But leadership will not come from technology alone. It will depend on batteries, affordable energy, research and development, skilled workers, resilient supply chains and a trade policy that gives European manufacturing the time and space to compete.

Chemicals. Can Europe remain a manufacturing power if it loses the chemical industries on which so many other industries depend? The objective should therefore be neither to preserve the past unchanged nor to abandon it. Europe should retain its basic chemical backbone, decarbonise it, and use it as the foundation for the next generation of higher-value industries.

Aerospace. What is technological sovereignty worth if Europe cannot design, build and maintain the systems on which its security and connectivity depend? Aerospace requires more than individual firms. It requires sustained R&D, strategic procurement, skilled talent, resilient supply chains and closer civilian–defence synergies. The aim should be to preserve and strengthen European aircraft and space champions before capabilities that took decades to build become difficult to recover.

Medical technology. Can Europe claim strategic resilience if essential medical technologies depend excessively on production elsewhere? The answer requires more than emergency stockpiles. Europe must create the conditions for innovation and scale-up, combine

intelligent regulation with strategic procurement, mobilise EIB financing, and rebuild manufacturing capabilities where dependence creates unacceptable vulnerabilities.

Semiconductors. Where will the technologies of the next industrial revolution be designed and produced? Europe cannot afford to answer: elsewhere. It should build technological sovereignty by scaling chip design and advanced manufacturing, securing access to critical equipment, mobilising public and private investment, and concentrating on areas in which European capabilities can become indispensable—particularly automotive, industrial and AI chips.

Energy equipment. And what is an energy transition without the capacity to manufacture the technologies that make it possible? Europe should seek leadership in grids, storage, hydrogen and power technologies. This requires strategic investment, European lead markets, resilient supply chains and, above all, energy prices that allow European industry to compete while it decarbonises.

Grid power equipment. Finally, who will build the infrastructure through which Europe's electrified economy must operate? Transformers, cables, substations and smart-grid technologies may appear less visible than the industries they enable, but they are no less strategic. Europe should accelerate investment, secure critical inputs and scale domestic manufacturing so that the grid itself becomes not a bottleneck to Europe's transition, but one of its competitive strengths.

The underlying principle is simple: **Europe should not ask only where it can buy the technologies it needs. It should ask which capabilities it must possess in order to remain competitive, resilient and sovereign.**

Overall, the findings indicate that contemporary EU industrial policy represents a **hybrid model of market openness, strategic intervention and managed interdependence**. The EU is neither simply returning to traditional industrial policy nor abandoning the principles of the internal market. Instead, it is adapting its industrial strategy to an environment in which economic competitiveness, resilience, technological capacity and geopolitical security have become increasingly interconnected. The resulting model is therefore best understood as an attempt to preserve the benefits of openness while making European economic interdependence more resilient, diversified and strategically manageable.

This demonstrate that the seven-handle framework is broadly fit for purpose, but it is analytically stronger if understood not as seven categories of industrial policy, but as dimensions along which industrial policy itself is changing. The central shift is from industrial policy as sector selection and intervention towards system orchestration under conditions of interdependence. Industrial policy is moving beyond correcting market failures and supporting selected sectors towards strategic objectives encompassing productivity, resilience, security, decarbonisation, technological sovereignty and regional development. The key question is which outcomes the state prioritises and what trade-offs it is prepared to accept. The focus is shifting from supporting individual firms towards building systemic capabilities across technology, skills, capital, infrastructure, management, supply chains and knowledge institutions. The central question is whether the economy possesses the capabilities required to deliver strategic transformation. Globalisation has made dependencies increasingly consequential. The objective is not self-sufficiency but managed interdependence: identifying which dependencies can be diversified, secured through partners or reduced through domestic capability, and which constitute unacceptable strategic vulnerabilities.

Industrial policy increasingly relies on coordinated policy portfolios rather than isolated interventions. R&D support, infrastructure, skills, standards, procurement, finance and regulation may need to operate together. The emphasis therefore shifts from instrument selection to policy-mix design, sequencing and conditionality. Modern production is organised through industrial ecosystems linking firms, suppliers, universities, infrastructure, energy, data, finance and markets. Industrial competitiveness consequently depends increasingly on the quality of these connections rather than on the productivity of individual firms alone. The state is moving from being primarily a policy designer and funder towards becoming a strategic coordinator and market shaper. Effective industrial transformation requires coordination among governments, firms, investors, universities, regions, regulators and international partners. Industrial policy should ultimately be judged by whether it changes the productive structure of the economy. Success may involve new industries, stronger supply chains, technological capability, higher-value activities, regional specialisation or transformed energy systems. The key question is whether intervention produces structural change rather than simply subsidising existing activity. The seven dimensions form a causal architecture: Direction establishes objectives; Capability determines what can be achieved; Interdependence identifies constraints; Instruments shape behaviour; Connectivity enables capabilities to circulate; Governance coordinates actors; and Reconfiguration captures the resulting

structural change.

Two cross-cutting tests strengthen the framework: adaptability, or the capacity of policy to learn and adjust, and additionality, or whether intervention generates investment and capability that would not otherwise have occurred. Taken together, the framework captures the broader transition from correcting market failures and supporting sectors towards shaping capabilities, managing strategic interdependence and deliberately reconfiguring industrial ecosystems.

The European industrial policy is set to undergo a fundamental transformation. What initially centred on market integration and the removal of barriers to economic activity has progressively expanded towards competitiveness, innovation, decarbonisation, resilience and, increasingly, economic security. The analysis therefore shows that EU industrial policy can no longer be understood solely through the traditional logic of market regulation. Instead, the EU is developing a more strategic and interventionist approach in which the protection and development of industrial capabilities have become increasingly important, something that is not given.

The findings provide an answer to the first research question by demonstrating that this transformation has occurred through a gradual **layering of strategic objectives onto the existing market-oriented framework**, rather than through a complete abandonment of market integration. Competition and openness remain central to the European economic model, but they increasingly coexist with industrial support, strategic investment, supply-chain diversification and measures aimed at strengthening European capabilities.

The second research question concerned the role of economic security. The analysis shows that economic security has broadened the objectives of industrial policy beyond efficiency and competitiveness. Critical dependencies, supply-chain disruptions, technological competition and geopolitical tensions have made resilience and security of supply increasingly important policy objectives. This has also expanded the range of instruments available to the EU, including investment support, diversification measures, strategic partnerships, technology policies and mechanisms for managing economic dependencies.

The third and fourth research questions demonstrate that the external environment has become an increasingly important component of European industrial strategy. Dependence on critical raw materials, energy, technologies, infrastructure and international supply chains means that European industrial resilience cannot be secured exclusively within EU territory. Trade, investment, connectivity and international partnerships are therefore increasingly incorporated into industrial policy. The distinction between **internal industrial policy and external economic policy is consequently becoming less clear**, as external relationships increasingly influence European productive capacity.

This leads to the central finding of the research: the EU is not simply moving from economic openness towards protectionism. Rather, it is moving towards **managed strategic interdependence**. Interdependence itself is not necessarily a vulnerability. Vulnerability emerges when critical dependencies are highly concentrated, alternatives are limited, or external relationships can be exploited for political or economic pressure. The objective of contemporary EU industrial policy is therefore increasingly to identify, diversify and manage dependencies rather than to eliminate international economic integration.

This finding also provides the basis for the research's theoretical contribution. The concept of **External Strategic Industrial Policy** captures the emerging external dimension of European industrial strategy. It refers to the coordinated use of industrial, trade, investment, infrastructure, energy, technology and diplomatic instruments to shape the external conditions necessary for European industrial transformation and resilience. The concept connects areas that have traditionally been analysed separately and demonstrates how domestic industrial capacity increasingly depends upon the governance of external economic relationships.

The four country cases—**Chile, Brazil, Nigeria and Kazakhstan**—illustrate how this external dimension can operate in practice. They demonstrate that strategic partnerships should not be limited to securing access to resources or markets. Instead, they can incorporate investment, processing capacity, technology transfer, infrastructure, energy cooperation, connectivity and local value creation. This suggests a shift from traditional importer–exporter relationships towards more **strategic and mutually beneficial industrial partnerships**.

The implications for Central Asia are particularly significant. Kazakhstan and the wider region can potentially contribute to European industrial resilience through critical raw materials, energy, transport corridors, connectivity and industrial development. However, the strategic value of these relationships depends on whether cooperation moves beyond resource extraction towards processing, investment, technology and value-added production. In this context, regional

organisations such as the OTS may provide complementary platforms for strengthening connectivity and managing interdependence across the Eurasian space.

The research therefore suggests that the future of European industrial policy will require stronger integration between its **internal and external dimensions**. Domestic industrial capacity, European competitiveness and strategic resilience increasingly depend upon diversified external partnerships. The EU does not need to pursue economic self-sufficiency; rather, it needs to develop the capacity to determine which dependencies are strategically acceptable, which should be reduced, and where cooperation can create mutual resilience.

This also has implications for EU governance and financing. Industrial policy will require stronger coordination between industrial, trade, energy, research, digital, climate, transport and external-policy instruments. Similarly, EU funding should be assessed not only according to expenditure but according to the productive capacity and additional investment it generates. The relevant outcomes should include **investment leverage, productivity, competitiveness, strategic resilience and ultimately higher potential GDP**.

Overall, the research concludes that the evolution of EU industrial policy can be understood as a movement from **market regulation, towards competitiveness, transformation and resilience, and ultimately towards the strategic management of interdependence**. The EU is not abandoning openness; it is attempting to make openness more resilient and strategically sustainable.

The central conclusion is therefore that **strategic autonomy and strategic interdependence are not opposites**. In an interconnected global economy, greater autonomy may depend precisely on the EU's ability to build diversified, reliable and mutually beneficial external relationships. The future of European industrial policy will consequently depend not only on what Europe produces within its borders, but also on how effectively it shapes the external networks of resources, energy, technology, infrastructure, finance and markets on which European production depends.

In this sense, **External Strategic Industrial Policy represents the next stage in the evolution of European industrial strategy**: not a retreat from globalisation, but an attempt to shape the terms on which Europe participates in it.

The greatest players in tomorrow’s industries will not be determined simply by the size of companies or the amount of money they possess. Authority will increasingly come from the ability to control capital, technology, infrastructure, markets, standards, skills and strategic resources. The United States will remain one of the most powerful actors because of its dominance in frontier technology, artificial intelligence, venture capital, financial markets and global technology companies. China will possess enormous industrial authority through its manufacturing scale, supply chains, batteries, renewable technologies, critical materials and capacity to mobilise state investment. The European Union will have a different but equally important form of authority through the size of its Single Market, its regulatory power, competition policy, trade policy and ability to establish global standards.

Within Europe, the European Commission will be one of the most important authorities because it controls or influences competition policy, state aid, trade policy, regulation and major European investment programmes. The European Council will provide the strategic political direction, particularly on competitiveness, energy, security and technological sovereignty. The Member States will retain enormous authority because they control substantial public investment, taxation, education, infrastructure and national industrial policy. The European Parliament will shape legislation and the EU budget, while the European Central Bank will influence the financial conditions under which industrial investment takes place.

Large technology companies will also exercise enormous authority because they control critical platforms, cloud infrastructure, AI systems, data and computing capacity. Global financial institutions and investors will determine which technologies receive enough capital to move from research into large-scale production. Universities and research institutions will control an important part of the knowledge base from which tomorrow’s industries emerge. Large industrial companies will determine where factories are built, where research is conducted and which technologies are commercialised.

But perhaps the most important authority will be market power itself. An actor that controls access to a large market can influence the behaviour of companies without directly controlling them. This is one of the EU’s greatest strengths. Europe may not own the world's largest technology companies, but it controls access to one of the world's largest consumer and industrial markets. Through regulation, standards, competition policy and procurement, the EU can therefore shape the behaviour of companies operating far beyond European borders.

The structural outcome of a more systematic strengthening of governance and a more pluralistic policymaking process would be a significant

reconfiguration of EU industrial policy. Rather than remaining a relatively fragmented and predominantly market-oriented policy area, EU industrial policy could evolve towards a more coordinated, strategic, and multi-level framework. Stronger governance would enhance coordination between the European Commission, member states, regional authorities, and other EU institutions, allowing industrial objectives to be integrated more consistently across areas such as competition, trade, investment, innovation, and economic security. At the same time, greater pluralism in policymaking would give business associations, trade unions, regions, civil society, and research organisations a stronger role in shaping policy priorities. This could increase the legitimacy, responsiveness, and accountability of industrial policy, while also introducing greater complexity and potential conflicts between competing interests. Overall, such a transformation would represent a shift towards a more interventionist and strategically oriented model of EU industrial policy, characterised by stronger institutional coordination, broader stakeholder participation, and a greater capacity to pursue long-term European economic and technological objectives.

This reconfiguration could also strengthen the EU's capacity to respond collectively to external economic and geopolitical pressures. A more integrated governance structure would facilitate faster coordination during crises, particularly in relation to supply-chain disruptions, energy security, technological dependencies, and competition from major global economies. It could also encourage greater coherence between EU-level industrial strategies and national industrial policies, reducing duplication and policy fragmentation across member states. At the same time, stronger EU coordination could create tensions with national governments that seek to preserve greater autonomy over their own industrial priorities. A more pluralistic policymaking process may further increase the influence of organised interests, making the policy process more inclusive but also potentially more difficult to reconcile around common objectives. The distribution of financial resources could become an important source of political negotiation, particularly between larger industrial economies and smaller member states. Furthermore, a stronger governance framework could provide greater stability and predictability for firms, encouraging long-term investment in strategic sectors and emerging technologies. It could also promote a more active role for public institutions in directing investment towards areas considered essential for Europe's competitiveness and resilience. In this context, industrial policy would increasingly become connected to broader objectives such as the green transition, digital transformation, energy independence, and economic security. The overall outcome would therefore not simply be a stronger industrial policy, but a broader institutional transformation in how economic priorities are defined, coordinated, and implemented across the EU. Ultimately, this could contribute to the emergence of a more strategic, participatory, and resilient European industrial policy regime.

The future industrial order will consequently be determined by the interaction of capital power, technological power, market power, regulatory power and infrastructure power. No single actor will control all five. The United States has exceptional technological and financial power. China has exceptional manufacturing and supply-chain power. The EU has exceptional regulatory and market-shaping power. Large companies possess technological and commercial power. States retain fiscal, political and strategic power.

For Europe, the central question is therefore not whether the EU can command tomorrow's industries. It cannot. The question is whether it can shape the environment in which those industries emerge. The EU can build markets, finance research, establish standards, regulate competition, develop infrastructure, coordinate Member States, support skills and reduce strategic dependencies. Its greatest authority may therefore be precisely its ability to shape markets without owning them.

The European strategy should consequently be to build the conditions for tomorrow's industries rather than attempt to choose tomorrow's winners. The EU should provide the energy, infrastructure, research, skills, capital framework, standards and market access that allow European firms to compete, to grow. In that sense, the greatest European industrial power will not be the power to command companies, but the power to create the environment in which the next generation of European industries can succeed.

EU industrial competitiveness requires increasing productivity, innovation, and investment while reducing regulatory and administrative burdens. It also requires strengthening European value chains and industrial ecosystems and improving access to affordable energy, critical raw materials, skills, and finance.

Strategic autonomy means reducing excessive dependencies on non-EU suppliers for critical technologies, raw materials, energy, and components. This involves diversifying international supply chains while maintaining openness to global trade, strengthening European capabilities in strategic sectors such as semiconductors, batteries, clean technologies, defence, and digital technologies, and improving resilience to geopolitical and supply-chain disruptions.

Industry 5.0 goes beyond the Industry 4.0 focus on automation and digitalisation. It emphasizes **human-centricity, sustainability, and resilience**. Technology should support workers, skills, safety, well-being, and meaningful work. Industrial production should use resources efficiently, reduce environmental impacts, and contribute to the circular economy. At the same time, companies need to be capable of responding to crises, supply disruptions, cyber threats, and other shocks.

Successful execution therefore requires translating these principles into concrete investments, technology deployment, workforce upskilling, resilient supply chains, sustainable production, and measurable competitiveness objectives.

In short, the EU's industrial direction can be summarized as **competitive, strategically autonomous, human-centred, sustainable, and resilient industry**.

this also comes with performance metrics, not to be blindsided by, but in order to

This also comes with performance metrics, not to be blindsided by, but in order to monitor progress, identify emerging gaps and risks, support informed decision-making, and ensure that industrial strategies translate into measurable improvements in competitiveness, resilience, sustainability, and strategic autonomy.

This also comes with performance metrics, not to be blindsided by, but in order to measure the concrete economic contribution of industrial activities, including their contribution to GDP, gross value added (GVA), productivity, investment, employment, export performance, and the return generated for companies. These metrics should help assess not only whether strategic objectives are being achieved, but also whether investments in competitiveness, strategic autonomy, digitalisation, and Industry 5.0 are translating into tangible economic value for companies and the wider EU economy. The impact of EU industrial strategies is often difficult to measure in concrete economic terms and is assessed primarily through policy outputs rather than their actual contribution to GDP, gross value added, productivity, investment, employment, competitiveness, and returns for companies. This creates a need for more robust performance metrics that can demonstrate whether EU industrial policies are translating into tangible economic value and strengthening Europe's long-term industrial position. A good outcome in industrial policy should ultimately be reflected in measurable economic value and improved industrial performance. This includes higher contribution to GDP and gross value added, increased productivity and investment, stronger company returns and profitability, quality employment, greater export competitiveness, more resilient supply chains, and reduced strategic dependencies. Importantly, the objective should not simply be to demonstrate that a policy has been implemented, but to show that it creates tangible value for companies and contributes to Europe's long-term competitiveness, resilience, sustainability, and strategic autonomy.

Thus, strengthened governance should lead to sound, stakeholder-based dialogue and systematic foresight, maximising the capacity to anticipate and manage changes in industrial competition before they develop into broader economic or geopolitical tensions. This creates space for strategic choices and forms of economic diplomacy that can maintain stable relationships, manage competing interests, reduce the risk of conflict, and preserve mutually beneficial economic interdependence. In this sense, effective industrial policy is not only about competitiveness and economic value creation; it can also contribute to peace and stability by providing mechanisms for dialogue, cooperation, and the peaceful management of economic and strategic competition.

Industrial competition by itself is rarely the main driver of conflict. More important are geopolitical rivalry, competition over critical resources and strategic dependencies, arms production and military capabilities, unequal distribution of economic gains, political instability, and the breakdown of diplomatic and institutional mechanisms for managing disputes.

Industrial policy matters because it can either **amplify or mitigate these pressures**. Policies that concentrate strategic dependencies, intensify resource competition, or accelerate the production and diffusion of military capabilities can increase risks. Conversely, policies that diversify supply chains, create economic interdependence, maintain channels of dialogue, and support civilian and sustainable industrial development can reduce them.

So, in terms of a peace-oriented industrial strategy, the question is not simply "How competitive is our industry?" but rather:

"Does our industrial and economic system reduce the conditions that generate conflict, or does it increase them?"

That provides a stronger basis for connecting industrial competitiveness, strategic autonomy, economic diplomacy, and peacebuilding.

Which industries are most dependent on critical minerals,

the strongest overlap is concentrated in a few strategic sectors:

Energy and clean technologies have very high exposure, particularly batteries, electric vehicles, wind turbines, solar technologies, and electricity grids. Lithium, nickel, cobalt, graphite, rare earth elements and copper are especially important.

Electronics and semiconductors depend on a wide range of critical minerals, including gallium, germanium, silicon, rare earths and certain specialty metals.

Aerospace and defence have particularly strong strategic exposure because of their reliance on rare earths, titanium, tungsten, gallium, germanium and other specialised materials used in advanced electronics, sensors, aircraft, missiles and other systems.

Automotive manufacturing overlaps substantially with critical minerals through batteries, electric motors, electronics and lightweight materials.

Machinery and advanced manufacturing depend on materials such as tungsten, cobalt, rare earths and high-performance metals for cutting tools, magnets, specialised alloys and industrial equipment.

Chemicals, pharmaceuticals and healthcare also have important dependencies, although generally more selectively, including on materials used as catalysts, in specialised equipment and in certain medical technologies.

From a **strategic-autonomy and peace perspective**, the most important intersection is arguably:

critical minerals → energy technologies → digital technologies → advanced manufacturing → aerospace/defence.

These sectors are interconnected, meaning that disruption in a relatively small number of upstream minerals can propagate through several downstream industries. That is why critical-mineral policy is not only a mining or resource issue; it is also an issue of **industrial resilience, economic security, technological sovereignty and geopolitical stability**.

Europe should produce at home what it cannot afford to lose. This includes defence, semiconductors, medicines, critical digital infrastructure, and parts of the clean-tech supply chain. But Europe cannot, and should not, produce everything itself; trying to do so would raise costs and weaken its competitiveness. It should therefore produce with trusted partners where it lacks the resources, energy, or scale to compete alone, especially in critical minerals and energy-intensive industries. It can safely import goods that are widely available, easily substituted, and not strategically important. The real question is not whether Europe should be self-sufficient, but where dependence creates a serious economic or security risk. The aim is therefore selective autonomy: keep strategic capabilities at home, diversify critical inputs through partners, and remain open to global trade where dependence is manageable.

It is essential the EU's authorities in industrial policy are strengthened to better wield the industrial capabilities of the European Economy in order to claw back market shares and exert social influence abroad, comparable to the value of Eu-based global brands and the exigencies of the internal market. At the same time, the EU must become a much more attractive *Standort* for both public investments by the EU and member states and increase the usage of FDI-flows, something Germany and the UK excel at whereas France actually get the most of FDI flows in the EU, something the med and eastern part of Europe can only envy, less so perhaps the riparian countries around the Baltic sea who are starting to catch-up with the cool banana. The EU is second to none in RDI in innovation but with a very poor conversion rate European MNC's have started moving up the goods of value.

The nature of European MNC is transnational as they operate across Europe and globally, they are Europeanised since they organise production, RDI, finance and distribution the EU single market rather than one single market, they are institutionally embedded by means of social interaction at EU-level and social partners. They are strategic actors shaping EU industrial competition, trade, technology, energy and regulatory policy. The EU MNC such as Siemens, Mærsk, ENI , Dangrote & BASF are hybrid in being corporate, national and European actors. Their influence work through networks by exercising their influence through supply chains, business associations, research partnerships and standard-setting rather than simply through ownership. And then they are also politically constrained compared to EU MNC in very deregulated markets, as they operate within stiff competition, environmental, labour, data, state aid and consumer protection regimes. As such they are embedded in a multi-level governance system, possessing both economic ressources and political influence while remaining dependent on the EU regulatory and market framework.

The reconfiguration of the EU's industrial policy is also a sound departure point for both a more strategic approach to trade policy and to reforms in the European Economy.

Under my leadership, the EU will develop into a pole in international relations in conjunction with the evolution of the European capitalist model, something that combined could lead to a system transformation in the EU, and by implication, in the global system.

The EU's Critical Raw Materials (CRM) policy can improve industrial resilience and strategic autonomy by reducing excessive dependencies, diversifying supply sources, strengthening recycling and circularity, and developing European extraction, processing and refining capacity**.** More importantly, it can improve the EU's ability to anticipate supply risks and manage geopolitical and economic tensions before they disrupt critical industries.

A stronger CRM strategy should therefore connect resource security with industrial policy, innovation, trade and economic diplomacy. The objective should not be complete self-sufficiency, which is neither realistic nor necessarily desirable, but a more diversified, resilient and cooperative supply system that reduces vulnerabilities while maintaining stable international economic relationships.

In this sense, CRM policy can contribute not only to competitiveness and strategic autonomy, but also to **economic stability and peace**, by reducing the likelihood that competition over strategically important resources becomes a source of geopolitical conflict.

The geopolitical economy of the green transition requires the European Union to move beyond a strategy centred solely on securing access to critical raw materials and towards a broader paradigm of technological diversification and strategic optionality. Technological innovation can reduce structural dependencies through material substitution, resource-efficient design, advanced recycling, and the development of less mineral-intensive production systems. Emerging technologies such as sodium-ion batteries, rare-earth-reduced motors, alternative photovoltaic chemistries, and advanced material recycling can progressively weaken dependence on geographically concentrated resources. At the systemic level, diversification across electrification, hydrogen, nuclear energy, renewable generation, storage, public transport, and energy-efficiency technologies can prevent the emergence of new forms of technological lock-in. Digitalisation and Industry 5.0 further reinforce this trajectory by increasing the productivity of materials, improving industrial efficiency, and enabling predictive maintenance, circular production, and more resilient value chains. Such technological optionality is strategically significant because it transforms critical minerals from an unavoidable geopolitical constraint into one variable within a wider portfolio of economic and technological choices. The objective of European strategic autonomy should therefore not be absolute self-sufficiency, but the capacity to retain sufficient technological, industrial, and diplomatic alternatives to withstand coercion, supply disruption, and geopolitical rivalry. In this sense, technological diversification becomes not only an instrument of competitiveness and resilience, but also a potential foundation for economic diplomacy and the peaceful management of intensifying competition over the resources of the green transition.

At the same time, the question arises in which industries the EU most become competitive , where technological leadership, economic value, and strategic dependence intersect. The priority sectors are likely to be advanced semiconductors and electronics, artificial intelligence and digital infrastructure, batteries and energy storage, renewable-energy technologies, electricity grids, advanced materials and chemicals, critical-mineral processing and recycling, robotics and advanced manufacturing, aerospace and defence, and biotechnology. Particular attention should also be given to clean industrial technologies, including low-carbon steel, cement, industrial heat, hydrogen, and carbon-management technologies, because these determine the competitiveness of Europe's wider manufacturing base. These sectors provide critical enabling capabilities across the wider economy and therefore generate significant spillovers in productivity, innovation, resilience and strategic autonomy. At the same time, Europe should reinforce the industrial foundations on which these sectors depend, including machine tools, specialised chemicals, power electronics, engineering, research infrastructure and skilled human capital. The objective should not be technological isolation, but **strategic diversification**: developing European capabilities where they are indispensable, while building reliable partnerships where international interdependence creates greater economic value. By responding to the geopolitical consequences of the green and digital transitions through **competitiveness, innovation, diversification, economic diplomacy and resilience**, Europe can move from reacting to external pressures towards actively shaping the emerging economic order. Such a strategy would allow the EU to manage competition without unnecessarily transforming economic interdependence into geopolitical confrontation. Ultimately, the strongest industrial strategy is therefore one that combines **economic strength with strategic choice**, enabling Europe to protect its interests while preserving the networks of trade, investment, technology and cooperation that contribute to international stability. In this sense, industrial policy can become not only an

instrument of competitiveness and strategic autonomy, but also a means of fostering **cooperation, stability and, ultimately, peace over confrontation**.

A differentiated approach to industrial policy would connect **competitiveness directly to strategic autonomy**, recognising that Europe's objective should not be universal self-sufficiency but the preservation of sufficient technological, industrial and commercial options to avoid excessive dependence on any single country, technology or supply chain. Industrial competitiveness should therefore be understood as a **strategic capability**, measured not simply through market share or export performance, but through its contribution to gross value added, productivity, investment, innovation, employment, technological leadership and long-term corporate returns. This requires Europe to distinguish between sectors in which it must achieve global leadership, sectors in which it must maintain competitive capacity, sectors where trusted partnerships provide greater economic efficiency, and activities where dependence on international markets is acceptable. Such differentiation is particularly important for critical raw materials, where strategic resilience may be achieved not only through new sources of supply, but through technological substitution, recycling, material efficiency and alternative production systems. **Economic diplomacy consequently becomes an integral component of industrial strategy**, enabling the EU to diversify partnerships, strengthen mutually beneficial interdependencies and manage competition with major powers such as China, the United States, India and Russia. Resilience should similarly be understood not as the elimination of external dependencies, but as the capacity to anticipate, absorb and adapt to disruption without losing essential industrial capabilities. Europe's distinctive advantage lies in the combination of its sophisticated industrial ecosystems, technological and scientific capabilities, large internal market, regulatory capacity and extensive network of international partnerships. The effective use of **NACE, PRODCOM, HS and ISIC** can provide the analytical foundation for identifying where economic value, technological capability, international dependency and geopolitical exposure converge, thereby allowing industrial policy to become more evidence-based and strategically selective. The purpose is ultimately not to protect every existing industry, but to determine where maintaining or developing European capabilities will generate the greatest economic, technological and strategic returns. In this sense, a differentiated industrial strategy gives Europe greater **strategic agency**: rather than merely responding to the geopolitical consequences of the green and digital transitions, Europe can actively shape the emerging economic order through competitiveness, innovation, diversification, economic diplomacy and resilience, while using these instruments to manage international competition in ways that favour **cooperation, stability and, ultimately, peace over confrontation**.

The automotive sector remains crucial, but its competitiveness increasingly depends on mastery of batteries, software, power electronics, autonomous systems, and advanced manufacturing rather than simply vehicle assembly. Equally important are the less visible upstream capabilities—machine tools, industrial equipment, precision engineering, sensors, power electronics, and specialised chemicals—that underpin multiple strategic industries simultaneously. From a strategic-autonomy perspective, the most valuable capabilities are therefore those that create high spillovers across the economy while reducing dependence on concentrated external suppliers. The objective should be to identify the sectors in which European technological leadership generates the greatest contribution to GDP, gross value added, productivity, employment, exports, and resilience, rather than attempting to preserve every existing industrial activity. This would make industrial policy a question not simply of protecting industries, but of building competitive advantage in the technologies that will determine Europe's economic and geopolitical position over the next decades.

Theoretical Implications

The findings have several theoretical implications for understanding the transformation of EU industrial policy. Most importantly, they suggest that contemporary EU industrial policy cannot be adequately explained through a theoretical distinction between **market-making and market-correcting intervention** alone. While these functions remain central to EU economic governance, the growing importance of resilience, economic security and strategic autonomy points towards a broader form of **market-shaping intervention**. The EU increasingly seeks not only to correct market failures or preserve competition, but also to influence the development of productive capacities, technologies, supply chains and strategic dependencies.

This finding has implications for theories that conceptualise the EU primarily as a regulatory power. The regulatory dimension of European economic governance remains important, but it increasingly operates alongside more interventionist forms of governance. Regulation is being complemented by financial support, investment coordination, industrial targets, supply-chain diversification and strategic partnerships. The theoretical implication is therefore not that the regulatory model has

disappeared, but that it has become **layered with strategic and developmental functions**. EU economic governance can consequently be understood as a hybrid institutional model in which regulatory and interventionist logics coexist.

A second theoretical implication concerns the concept of **economic security**. Traditionally, economic policy has often been analysed through the objectives of efficiency, growth and competitiveness, while security has been treated primarily as a separate geopolitical or defence concern. The findings indicate that this distinction is becoming increasingly difficult to maintain. Dependencies on critical resources, technologies and external supply chains can generate vulnerabilities that have both economic and geopolitical consequences. Economic security therefore acts as a mechanism through which questions of industrial capacity become questions of strategic security. This suggests that the theoretical boundaries between **economic policy and security policy are becoming increasingly blurred**.

Third, the findings contribute to theories of **strategic autonomy and interdependence**. Strategic autonomy should not necessarily be interpreted as the pursuit of self-sufficiency or economic isolation. The EU's continued dependence on global markets makes complete autonomy unrealistic. Instead, the analysis points towards a more nuanced understanding in which autonomy concerns the capacity to maintain strategic choices despite external dependencies. This reframes autonomy as a question of **capacity, diversification and resilience**, rather than independence from international economic relationships.

This leads to the fourth and perhaps central theoretical implication: the concept of **managed strategic interdependence**. The findings suggest that the EU is neither simply maintaining traditional economic openness nor moving straightforwardly towards protectionism. Instead, it is attempting to govern the conditions under which interdependence produces benefits and vulnerabilities. This involves identifying critical dependencies, diversifying supply, developing domestic capabilities where necessary, and using international partnerships to reduce excessive exposure. Interdependence therefore becomes not merely an economic condition but an object of policy intervention.

The concept of managed strategic interdependence also provides a way of reconciling apparently contradictory developments in EU policy. The simultaneous promotion of open markets and stronger strategic intervention is not necessarily a contradiction. Rather, the two can be understood as complementary elements of a new policy logic: **openness remains valuable, but openness is increasingly conditioned by considerations of resilience and security**. The theoretical contribution of the research is therefore to move beyond a binary distinction between openness and protectionism and towards a framework that captures the strategic management of continued interdependence.

Finally, the findings suggest that EU industrial policy should be theorised as an increasingly **multi-level and multi-dimensional form of economic governance**. Industrial outcomes emerge from the interaction of EU institutions, Member States, firms, financial instruments, regulatory frameworks and external partners. The distinction between internal and external policy is similarly becoming less analytically useful, as trade, investment, connectivity and international partnerships increasingly contribute to domestic industrial objectives. A comprehensive theoretical understanding of contemporary EU industrial policy therefore requires attention to both its internal governance structures and its external economic relationships.

Taken together, these implications suggest that the transformation of EU industrial policy represents more than a change in individual policy instruments. It reflects a broader transformation in the underlying logic of European economic governance: from a predominant concern with **market integration and efficiency towards a more complex combination of efficiency, resilience, security and strategic capacity**. The theoretical contribution of this research is therefore to conceptualise contemporary EU industrial policy as a hybrid form of governance in which market openness and strategic intervention are not mutually exclusive, but are increasingly combined through the management of economic interdependence.

The question of whether Europe can sustain a genuinely European industrial policy without developing a genuinely European fiscal capacity goes to the heart of the European Union's unresolved constitutional dilemma: the persistent asymmetry between the scale at which strategic objectives are defined and the scale at which the fiscal instruments necessary to achieve them remain organised. If industrial policy is increasingly understood not merely as a matter of correcting market failures, but as an instrument of strategic autonomy, economic security, technological sovereignty, and geopolitical resilience, then its effective provision becomes difficult to reconcile with a system in which fiscal capacity remains predominantly national.

The fundamental problem is one of collective action. Strategic autonomy generates benefits that transcend national borders. Investments in semiconductors, energy infrastructure, defence technologies, critical raw

materials, digital networks, and advanced manufacturing do not simply enhance the productive capacity of the member state in which they are located; they contribute to the resilience and strategic capabilities of the European economy as a whole. In this sense, strategic autonomy possesses the characteristics of a European public good. Yet the fiscal costs associated with producing that public good remain distributed unevenly across national budgets. This creates an institutional incongruity: Europe may articulate common strategic priorities while retaining predominantly national means of financing them.

The consequences are not merely distributive; they are structural. Where industrial policy depends primarily upon national fiscal capacity, the ability of individual member states to support strategic sectors becomes partly a function of their pre-existing budgetary strength. States possessing greater fiscal space can subsidise firms, finance infrastructure, provide guarantees, and absorb the risks associated with technological investment on a scale unavailable to states facing tighter fiscal constraints. The result is a potential fragmentation of the internal market precisely when European industrial policy seeks to strengthen it. A policy formally directed towards European strategic autonomy may therefore reproduce, within the Union, the very asymmetries that it is intended to overcome.

This raises a deeper question concerning the meaning of European sovereignty. If strategic autonomy is genuinely European rather than merely the aggregate outcome of national strategies, then its financing cannot be treated exclusively as a national responsibility. A European strategic objective financed through nationally differentiated fiscal capacities is liable to become less a common policy than a competition among member states possessing unequal capacities to implement it. The issue is therefore not simply whether the Union should spend more, but whether the institutional architecture of European governance is capable of matching the territorial scale of the objectives it has set itself.

The provocative formulation—if strategic autonomy is a European public good, why should the ability to pursue it depend upon the size of each member state's national budget?—thus exposes a fundamental contradiction. Public goods are conventionally underprovided when their benefits are collective but their costs are borne individually. The European predicament is an institutionalised version of precisely this problem. Member states are asked to finance investments whose strategic returns are partially European, while simultaneously being constrained by national fiscal rules and divergent debt positions. The political economy that follows is predictable: each government has an incentive to protect domestic productive capacity, while the Union as a whole has an interest in coordinating investment across borders and allocating resources according to strategic rather than purely national considerations.

A genuinely European industrial policy would therefore require more than common objectives, regulatory coordination, or the aggregation of national subsidy schemes. It would require some form of common fiscal capacity capable of socialising at least part of the financial risk associated with European strategic investment. Such capacity need not imply the wholesale transformation of the Union into a federal fiscal state. It could instead take the form of permanent European borrowing instruments, common investment funds, joint procurement mechanisms, or revenue streams specifically dedicated to strategic European goods. What matters institutionally is that the capacity to pursue European objectives should not fluctuate mechanically with the fiscal position of individual member states.

The argument, however, should not be reduced to a simple case for unlimited common borrowing or centralised spending. European fiscal capacity raises equally serious questions of democratic accountability, moral hazard, allocation, and political legitimacy. A common fiscal instrument can correct one asymmetry while creating another if decision-making over expenditure becomes insufficiently accountable or if resources are captured by politically powerful sectors or regions. The challenge is therefore to construct a fiscal architecture in which common financing is accompanied by common strategic priorities, transparent conditionality, credible governance, and mechanisms capable of preventing the internal market from being distorted by nationally differentiated state capacity.

The deeper issue is ultimately constitutional rather than merely economic. The European Union has progressively acquired competences whose effective exercise presupposes resources that remain largely located at the national level. This mismatch becomes particularly consequential in an era in which economic security, technological competition, energy resilience, and defence are increasingly understood as mutually reinforcing dimensions of sovereignty. The more Europe seeks to act as a strategic actor, the more difficult it becomes to sustain a sharp separation between European policy-making and national fiscal capacity.

Consequently, the question is not simply whether Europe *can* have an industrial policy without European fiscal capacity. It can—and, indeed, it already does, through a

combination of regulation, national expenditure, state aid, European programmes, and coordinated initiatives. The more consequential question is whether such an arrangement can produce an industrial policy that is genuinely European in its distributional effects, strategic coherence, and capacity to mobilise resources at the necessary scale. Without a corresponding fiscal architecture, European industrial policy risks remaining an aggregation of national capacities rather than the expression of a common European capability.

"Strategic autonomy" , a system export from defence politics, therefore presents the European Union with a particularly revealing institutional choice. Either strategic objectives remain substantially national in their financing, in which case the Union must accept that the pursuit of autonomy will be conditioned by divergent national fiscal capacities; or Europe treats strategic autonomy as a genuinely common public good, in which case some degree of common fiscal capacity becomes difficult to avoid. The central issue is not whether fiscal federalism is politically desirable in the abstract, but whether European sovereignty can be exercised credibly when the fiscal means required to produce it remain overwhelmingly national. In that sense, the debate over industrial policy is ultimately a debate over the unfinished political economy of European integration itself.

Further research

The findings of this research also open several avenues for further study. First, future research could examine whether the emerging concept of External Strategic Industrial Policy develops into a coherent and institutionalised component of EU policy or remains a collection of loosely connected initiatives. This would require longitudinal analysis of EU legislation, funding programmes, trade agreements and external partnerships to determine whether the external dimension of industrial policy becomes increasingly systematic over time.

Second, further research could investigate the effectiveness of different forms of strategic partnership. The cases of Chile, Brazil, Nigeria and Kazakhstan suggest that external industrial partnerships can contribute to European resilience, but their effectiveness depends on the extent to which they generate diversification, investment, technology transfer and value-added production. Comparative research could therefore assess which partnership models produce the greatest benefits for both the EU and partner countries.

Third, future research should examine the potential trade-offs associated with managed strategic interdependence. Diversification may increase resilience but also increase costs. Domestic production may strengthen security of supply but reduce short-term efficiency. Strategic partnerships may reduce dependence on one supplier while creating new dependencies elsewhere. Further research should therefore assess the relationship between resilience, efficiency, competitiveness and strategic autonomy rather than treating these objectives as automatically complementary.

Finally, future research could develop more precise quantitative indicators for measuring strategic resilience. Existing measures of competitiveness and productivity do not fully capture exposure to concentrated suppliers, geopolitical risks or technological dependencies. A more comprehensive framework could combine economic indicators with measures of supply concentration, diversification, substitutability, infrastructure security and technological capability.

Counter arguments

The concept of External Strategic Industrial Policy raises several important counterarguments that need to be addressed. The first concerns the potential tension between strategic intervention and the principles of the Single Market. Greater state intervention, subsidies and strategic support can distort competition and potentially favour less efficient firms or sectors. From this perspective, the expansion of industrial policy could weaken the market mechanisms that have traditionally supported European competitiveness. The response is not to reject intervention altogether, but to ensure that it remains targeted, proportionate and justified by clearly identified market failures or strategic vulnerabilities.

A second counterargument concerns the distinction between dependence and vulnerability. Not every external dependency constitutes a strategic risk. International economic interdependence can generate efficiency, lower costs, innovation and access to resources that would otherwise be unavailable. Attempting to reduce all dependencies would therefore be economically inefficient and potentially impossible. The concept of strategic interdependence must consequently avoid treating dependence itself as a problem. The relevant question is whether a dependency is sufficiently concentrated, difficult to replace or politically exploitable to constitute a vulnerability.

A third counterargument concerns the possibility of protectionism through the language of economic security. Economic security can provide legitimate reasons for intervention, but it could also become a broad justification for restricting trade, subsidising domestic industries or

favouring European producers. If applied too broadly, strategic industrial policy could gradually undermine the openness on which European industry continues to depend. Clear criteria are therefore necessary to distinguish genuine strategic vulnerabilities from ordinary competitive pressures.

A fourth concern relates to the cost of resilience. Diversifying suppliers, establishing alternative production capacity and maintaining additional infrastructure can increase costs compared with relying on the most efficient global supplier. Resilience therefore involves an economic trade-off. The objective should not be maximum resilience at any cost, but an economically proportionate level of resilience that reflects the strategic importance of the dependency.

A fifth counterargument concerns the possibility that external industrial partnerships could create new dependencies rather than reduce existing ones. Diversifying away from one supplier does not automatically guarantee greater autonomy if the EU becomes dependent on another country, another technology or another transport corridor. External Strategic Industrial Policy must therefore be understood as an ongoing process of diversification and risk management rather than as the achievement of a final state of autonomy.

Finally, there is a broader geopolitical concern. A more strategic European approach to trade, investment and external partnerships could be interpreted by other countries as an attempt to compete for influence or resources. This could intensify geopolitical rivalry and encourage other actors to adopt similarly interventionist policies. The EU therefore faces the challenge of strengthening its strategic position without contributing unnecessarily to the fragmentation of the global economy.

These counterarguments do not invalidate the concept of External Strategic Industrial Policy. Rather, they establish the conditions under which it should operate. Strategic intervention should remain selective, evidence-based, proportionate and compatible with economic openness. The objective should be to reduce critical vulnerabilities while preserving the economic benefits of international interdependence

Scenarios

The future development of European industrial policy can be understood through three broad scenarios. These scenarios are not predictions but analytical possibilities that illustrate the different directions the EU could take as it responds to increasing economic and geopolitical uncertainty.

Scenario 1: Managed Strategic Interdependence

In the first scenario, the EU continues to combine market openness with targeted strategic intervention. Rather than seeking economic self-sufficiency, the Union systematically identifies critical dependencies, diversifies suppliers, strengthens domestic capabilities where necessary and develops long-term partnerships with external economies.

Under this scenario, External Strategic Industrial Policy becomes an increasingly established component of EU economic governance. Trade, investment, energy, infrastructure, technology and industrial policy become more closely coordinated. Partnerships with countries such as Kazakhstan, Chile, Brazil and other resource- and technology-rich economies increasingly focus on processing, investment, infrastructure and value-chain development rather than simply securing access to raw materials.

This scenario represents the concept of managed strategic interdependence developed in this research. Europe remains deeply integrated into the global economy but develops greater capacity to determine the terms and risks of that interdependence.

Scenario 2: Strategic Fragmentation

In the second scenario, geopolitical rivalry intensifies and global economic relations become increasingly fragmented. Supply-chain disruptions, technological competition, energy insecurity and conflicts could encourage the EU to prioritise domestic production and strategic autonomy more aggressively.

Under these circumstances, industrial policy could become more protectionist. Subsidies, local-content requirements, screening mechanisms and restrictions on foreign dependencies could expand. The EU could seek to internalise a larger share of strategic production.

This scenario could strengthen European capabilities in selected sectors, but it would also involve significant costs. Reduced access to global markets, higher production costs and retaliatory measures from trading partners could undermine competitiveness. Strategic fragmentation could therefore strengthen security in some areas while weakening economic efficiency and international cooperation.

Scenario 3: Renewed Market-Led Openness

A third scenario would involve a partial return to a more market-oriented approach. If geopolitical tensions decline and global supply chains stabilise, the economic costs of

extensive intervention could encourage the EU to place greater emphasis again on competition, trade liberalisation and market efficiency.

Under this scenario, strategic industrial interventions would remain concentrated in a limited number of genuinely critical sectors, while most industrial activity would continue to be governed primarily by market forces. External partnerships would focus mainly on trade and investment rather than strategic industrial coordination.

This model could preserve efficiency and international integration, but it could also leave the EU more exposed to concentrated dependencies and future external shocks. The experience of recent supply-chain disruptions suggests that purely market-based efficiency may not adequately account for geopolitical and systemic risks.

Overall Assessment

Of the three scenarios, managed strategic interdependence appears most consistent with the trajectory identified in this research. The EU is unlikely to achieve complete self-sufficiency, nor would a return to an entirely market-led model fully address the vulnerabilities created by geopolitical and technological change.

The emerging direction is therefore likely to remain between these extremes: maintaining international openness while selectively intervening where dependencies become strategically significant. The key challenge will be determining where intervention is necessary, how much intervention is proportionate, and how strategic resilience can be achieved without undermining the openness that remains fundamental to European prosperity.

Policy recommendations

The findings of this research lead to several policy recommendations for the future development of EU industrial policy. The central recommendation is that the EU should move towards a more integrated internal and external industrial strategy, recognising that European industrial competitiveness increasingly depends on external resources, technologies, infrastructure, energy and markets.

1. Establish an External Strategic Industrial Policy framework

The EU should develop a coherent framework for External Strategic Industrial Policy that connects industrial policy with trade, investment, energy, infrastructure, technology and external relations. Rather than creating an entirely new policy area, this framework could coordinate existing instruments and identify external relationships that are strategically relevant to European industrial capacity.

2. Distinguish strategic vulnerabilities from ordinary dependencies

The EU should establish clearer criteria for identifying critical dependencies. Not every dependence on foreign suppliers represents a strategic vulnerability. Assessment should consider supplier concentration, availability of alternatives, substitutability, transport routes, technological dependence and geopolitical risk. This would allow the EU to target intervention where it is genuinely necessary rather than pursuing broad-based economic de-risking.

3. Prioritise diversification over self-sufficiency

European industrial policy should focus on diversifying strategic dependencies rather than eliminating external dependence. Complete self-sufficiency would be economically costly and unrealistic for many resources and technologies. A combination of domestic capacity, multiple international suppliers, strategic reserves and alternative transport routes would provide a more sustainable form of resilience.

4. Develop strategic industrial partnerships

The EU should move beyond traditional trade relationships towards long-term industrial partnerships with strategically relevant countries. Such partnerships should combine access to resources and markets with investment, infrastructure, technology transfer, skills development and local processing.

This approach would be particularly relevant to countries such as Chile, Brazil, Nigeria and Kazakhstan, where cooperation can extend beyond resource access towards the development of resilient and mutually beneficial value chains.

5. Strengthen EU–Central Asia industrial cooperation

Central Asia should receive greater attention within the EU's external industrial strategy. The region has potential relevance for critical raw materials, energy, transport connectivity, logistics and emerging industrial value chains. Cooperation with Kazakhstan and other Central Asian states should therefore focus not simply on importing resources but on processing, infrastructure,

renewable energy, technology, investment and value-added production.

The EU should also explore how regional platforms such as the Organisation of Turkic States can complement European connectivity and industrial initiatives, particularly where they contribute to diversified transport corridors and stronger links between Central Asia, the Caspian region, Türkiye and European markets.

6. Link critical raw-material partnerships to value creation

Future agreements on critical raw materials should avoid creating simple extractive relationships in which Europe imports unprocessed resources while value creation remains elsewhere. Where economically and environmentally viable, partnerships should include processing capacity, infrastructure, technology transfer and investment in downstream industries.

This would strengthen European supply security while simultaneously supporting industrial development in partner countries.

7. Strengthen institutional coordination

The EU should improve coordination between the institutions and policy areas that increasingly contribute to industrial strategy. Industrial, trade, competition, energy, research, digital, climate, transport and external policies should be assessed more systematically as interconnected components of European industrial resilience.

The objective should not necessarily be the creation of new institutions or competences, but better coordination of existing powers, budgets and instruments.

8. Create a stronger EU industrial financing architecture

European industrial policy requires predictable and sufficiently large financing mechanisms. The proposed increase in EU resources for industrial policy and competitiveness should be designed to mobilise additional public and private investment, rather than simply replace existing national or private expenditure.

The EIB, EU budget, Member-State financing and private capital should therefore operate within a more coherent investment architecture focused on strategic industrial objectives.

9. Introduce outcome-based industrial policy KPIs

EU industrial spending should be evaluated through measurable outcomes rather than expenditure alone. A common KPI framework should measure:

- investment mobilisation and additionality;
- productivity growth;
- innovation and technological capacity;
- industrial competitiveness;
- supply-chain diversification;
- strategic resilience;
- employment and skills;
- reduction of critical dependencies; and
- contribution to long-term potential GDP.

This would strengthen accountability and allow policymakers to distinguish between programmes that generate genuine additional productive capacity and those that merely redistribute existing economic activity.

10. Maintain competition and openness as safeguards

Strategic industrial policy should not become a justification for permanent protectionism. EU intervention should remain targeted, proportionate, transparent and evidence-based, with clear criteria for when strategic support is justified.

The objective should be to create a more resilient form of openness rather than to replace the Single Market with state-directed production. Competition remains important because inefficient industrial support can ultimately weaken the very competitiveness that industrial policy seeks to strengthen.

11. Develop strategic connectivity as industrial infrastructure

Transport, energy and digital connectivity should increasingly be treated as components of industrial policy. Diversified corridors can reduce dependence on individual routes and suppliers while improving access to international markets.

For Europe, this makes initiatives connecting Central Asia, the Caspian region, Türkiye and the EU particularly relevant. Infrastructure partnerships should therefore be assessed not only according to their immediate

connectivity benefits but also according to their contribution to long-term industrial resilience.

12. Adopt a partnership-based approach to strategic autonomy

Finally, the EU should redefine strategic autonomy as the capacity to make strategic choices while remaining internationally connected, rather than as independence from external economic relationships.

This means that strategic autonomy should be built through a combination of domestic capabilities, diversified supply chains and reliable international partnerships. The objective should be neither autarky nor unrestricted dependence, but managed strategic interdependence.

13. Methodological issues

The EU should establish a harmonised industrial data-aggregation framework based on systematic collection and integration of member-state data from UNIDO and complementary international sources. This would address current inconsistencies in data availability, definitions and aggregation between the EU and national economies. The framework should standardise sector classifications, reporting periods, units and productivity measures, while maintaining transparent procedures for addressing missing data and avoiding double counting. Such a system would provide a more reliable basis for measuring the EU's collective industrial capacity and benchmarking it against the United States, China, India and Russia. It would also strengthen the evidence base for EU strategic-autonomy policy, industrial planning and supply-chain resilience assessments. To make a difference, it adopts a communication strategy to ensure policy makers have the knowledge they ask for and are in need of to make enlightened strategic choices.

Overall Recommendation

The overarching recommendation is therefore that the EU should institutionalise a more coherent External Strategic Industrial Policy while preserving the principles of the Single Market and international economic openness. European industrial strength will increasingly depend on the EU's ability to combine domestic productive capacity with diversified external partnerships.

The policy objective should consequently be clear: not to withdraw from globalisation, but to shape the conditions under which Europe participates in it. By combining strategic investment, resilient supply chains, competitive markets, stronger external partnerships and outcome-based governance, the EU can strengthen both its industrial competitiveness and its strategic autonomy.

Perspective

If the history of European industrial policy teaches us anything, it is that policy must change when the conditions of prosperity change. Europe first sought to remove the barriers that divided its markets; it then sought to make those markets more competitive, more innovative and more sustainable. In recent years, it has sought to make them more resilient. The question that now follows is whether resilience can be secured within Europe alone.

It cannot.

No European industrial strategy can be complete when the factories of Europe depend upon resources drawn from distant lands, technologies developed beyond its borders, energy transported across continents, infrastructure connecting foreign markets, and supply chains extending far beyond the jurisdiction of the Union. If the prosperity of European industry depends in part upon these external conditions, then those conditions must necessarily form part of European industrial policy.

This does not mean that Europe should seek to withdraw from the world. Such an ambition would mistake independence for strength. A Europe that attempted to produce everything itself would sacrifice efficiency, innovation and access to resources that international exchange provides. Nor would such an objective be realistic. The strength of Europe has never rested upon isolation, but upon its ability to combine its own capabilities with the capabilities of others.

The task, therefore, is not to abolish interdependence, but to govern it wisely.

This is the principle that may define the next stage of European industrial policy: managed strategic interdependence. The question is no longer simply whether Europe depends upon others, for dependence is an unavoidable feature of a global economy. The more important questions are: *Upon whom does Europe depend? For what? Through which routes? With what alternatives? And at what cost if those relationships are interrupted?*

Here lies the distinction between dependence and vulnerability. Dependence may be efficient and mutually beneficial when supply is diversified and alternatives remain available. Vulnerability arises when essential resources, technologies or routes become concentrated in the hands of a small number of actors and can therefore be transformed from economic relationships into

instruments of political pressure.

It is in response to this problem that the concept of External Strategic Industrial Policy acquires significance. European industrial policy must increasingly look beyond the production that takes place within the Union towards the external networks that make that production possible. Trade, investment, energy, technology, infrastructure, connectivity and diplomacy should therefore not be viewed as entirely separate from industrial strategy where they directly affect Europe's productive capacity and resilience.

This does not require the creation of an entirely new European economic order. It requires something more practical: greater coherence between policies that have too often been considered separately. The industrial policy of tomorrow will necessarily involve the trade agreement, the energy corridor, the investment partnership, the technology arrangement and the transport route. What appears externally to be trade or diplomacy may, from the perspective of European industrial resilience, be industrial policy by another name.

This perspective is particularly relevant to Central Asia. The region should not be viewed merely as a distant source of raw materials, nor should European engagement be reduced to the question of how resources can be brought into European markets. The more ambitious question is whether Europe and its partners can build durable industrial relationships around those resources: processing them, investing in infrastructure, developing technology, expanding renewable energy, improving connectivity and creating value locally.

Kazakhstan illustrates this possibility especially clearly. Its geographical position, resource base, energy potential and role in Eurasian connectivity give it significance beyond the simple supply of commodities. The opportunity for Europe lies not merely in securing what Kazakhstan possesses, but in helping to construct the infrastructure, investment and industrial capabilities through which both sides may gain greater value and resilience.

The same principle applies to regional cooperation. Organisations such as the Organisation of Turkic States may become relevant not because they replace European institutions, but because they can contribute to the regional infrastructure through which European and Central Asian economies become connected. Where regional cooperation strengthens transport, energy, investment and trade diversification, it can contribute to the wider European objective of managing strategic interdependence.

Yet prudence is required. A policy that seeks resilience at any price may cease to be competitive. A policy that protects every industry may protect none efficiently. A policy that seeks to eliminate every dependency may create new dependencies elsewhere. And a policy that treats every external partner merely as a supplier risks reproducing the very vulnerabilities it seeks to overcome.

The objective must therefore be balance.

Europe must remain open, but not naïve; competitive, but not vulnerable; autonomous, but not isolated. It must retain the advantages of international markets while acquiring the capacity to withstand their disruptions. It must build domestic capabilities where they are strategically necessary, while maintaining external partnerships where cooperation produces greater prosperity and resilience.

This is ultimately the meaning of strategic autonomy in an interconnected world. Autonomy does not consist in needing no one; it consists in possessing sufficient choices that no single dependency can determine one's course. A strong Europe is therefore not one that stands apart from the global economy, but one that can participate in it without surrendering its capacity to act.

The future of European industrial policy will consequently be determined not only by what Europe produces within its borders, but by the external architecture through which European production is supplied, connected and sustained. If the first age of European industrial policy was concerned with removing borders, and the second with strengthening markets, the emerging age will be concerned with governing the interdependence that lies beyond them.

The challenge before Europe is therefore not whether it should choose between openness and autonomy. It is whether it possesses the wisdom to make the two compatible. External Strategic Industrial Policy offers one possible answer: not withdrawal from the world, but the deliberate shaping of Europe's place within it.

How else could the Age of Man be inaugurated if it were not for the interpenetration and cooperation between a well-structured relationship between supranational authority and the member states in the building of the European capitalism ?

After all, our womenfolk excel in the creation of prosperous, stable and creative polities. And this should also be imbibed in how the EU budget is geared to growth hence requires an organisation that dovetails with policy objectives and delivers on the ground to the citizens of The European Union.

APPENDIX 1 – DIALOGAL Q & A

Thomas Manabu argues for a more dialogical questioning in research , probing assumptions, political economy, strategic autonomy, state capacity, and power relations, leading to some questions that could drive a discussion on EU industrial policy:

1. When EU policymakers speak of "competitiveness," competitiveness against whom, and for whose benefit?
2. Can Europe realistically pursue strategic autonomy while remaining deeply dependent on US technology, finance, and security guarantees?
3. Is the EU's industrial policy primarily about rebuilding productive capacity, or about protecting existing corporate champions?
4. Why did the EU embrace market liberalization for decades and then rediscover industrial policy only after geopolitical shocks?
5. Does the EU have the institutional capacity to run a coherent industrial strategy, or is industrial policy fragmented across member states with conflicting interests?
6. Can a genuine European industrial policy exist without a substantial common fiscal capacity at the EU level?
7. Why should taxpayers subsidize strategic industries if the resulting profits remain largely private?
8. Is state aid flexibility strengthening Europe as a whole, or simply allowing richer member states to outspend poorer ones?
9. What lessons should Europe draw from the industrial strategies of China, South Korea, and the United States?
10. Is the Green Deal an industrial strategy with environmental goals, or an environmental strategy searching for an industrial rationale?
11. How can the EU decarbonize industry without accelerating deindustrialization?
12. If cheap energy is a prerequisite for manufacturing competitiveness, what is Europe's long-term energy model?
13. Are current semiconductor initiatives designed to create technological sovereignty, or merely to attract foreign investment?
14. How should Europe measure the success of industrial policy: GDP growth, productivity, employment, technological leadership, resilience, or something else?
15. Does industrial policy require governments to "pick winners," or is the real challenge creating ecosystems in which winners can emerge?
16. To what extent is EU competition policy in tension with the goal of creating globally competitive firms?
17. Should Europe prioritize resilience over efficiency, even if that means higher costs for consumers?
18. What sectors are truly strategic, and who gets to decide?
19. Is industrial policy ultimately an economic project, or a political project about sovereignty and democratic control?
20. If Europe fails to rebuild its industrial base, what are the broader implications for its geopolitical influence and social model?
21. What should Europe lead globally, and where should it cooperate?
22. Which sectors and technologies deserve priority?
23. How does Europe create demand for European technologies at home and abroad?
24. How do we turn European savings, EIB/EU funds and private capital into productive investment?
25. How do we actually build factories, infrastructure, skills and supply chains faster?

These questions are designed to move beyond technical policy details and toward the deeper issues of power, sovereignty, institutions, and political economy that characterize this style of discussion.

References

1. Adler, Nancy & J., & Gundersen, A. (2008). *International dimensions of organizational behavior* (5th ed.). Thomson South-Western.

2. Aiginger, K., & Rodrik, D. (2020). Rebirth of industrial policy and an agenda for the future. *Journal of Industry, Competition and Trade, 20*, 189–207. https://doi.org/10.1007/s10842-019-00322-3

3. Baldwin, R. (2016). *The great convergence: Information technology and the new globalization*. Harvard University Press. https://www.hup.harvard.edu/books/9780674660489

4. Blauberger, M. (2009). Of "good" and "bad" subsidies: European state aid control through soft and hard law. *Journal of Common Market Studies, 47*(5), 719–741. https://doi.org/10.1111/j.1468-5965.2009.02002.x

5. Bongardt, A., & Torres, F. (2022). The competitiveness and cohesion of the European Union: The role of industrial policy. *Intereconomics, 57*(2), 78–83. https://www.intereconomics.eu/

6. Bradford, A. (2020). *The Brussels effect: How the European Union rules the world*. Oxford University Press. https://doi.org/10.1093/oso/9780190088583.001.0001

7. Brunnermeier, M. K., James, H., & Landau, J.-P. (2016). *The euro and the battle of ideas*. Princeton University Press. https://press.princeton.edu/books/hardcover/9780691173005/the-euro-and-the-battle-of-ideas

8. Bulfone, F. (2022). Industrial policy and the European Union: From market failure to strategic autonomy. *[Journal/source details should be verified against the version you are using].*

9. Celi, G., Guarascio, D., & Reljic, J. (2022). The asymmetric impact of the COVID-19 crisis on EU member states: Industrial policy and economic resilience. *Structural Change and Economic Dynamics, 61*, 1–13. https://doi.org/10.1016/j.strueco.2022.02.004

10. Chang, H.-J. (2002). *Kicking away the ladder: Development strategy in historical perspective*. Anthem Press. https://anthempress.com/kicking-away-the-ladder-pdf

11. Cimoli, M., Dosi, G., & Stiglitz, J. E. (Eds.). (2009). *Industrial policy and development: The political economy of capabilities accumulation*. Oxford University Press. https://global.oup.com/academic/

12. Di Carlo, D., McNamara, K. R., & Moschella, M. (2026). The new politics of EU industrial policy: From the regulatory state to a transformational state. *Governance, 39*(3). https://doi.org/10.1111/gove.70133

13. Di Carlo, D., & Schmitz, L. (2023). Europe's new industrial policy: An analysis of the EU's emerging developmental network state. *Journal of European Public Policy, 30*(10), 1950–1977. https://doi.org/10.1080/13501763.2022.2127414

14. Dermine, P. (2026). Industrial policy in the European Union: Between coordination and fragmentation. *Governance*. Advance online publication. https://doi.org/10.1111/gove.70085

15. Draghi, M. (2024). *The future of European competitiveness: Part A—A competitiveness strategy for Europe*. European Commission. https://commission.europa.eu/topics/eu-competitiveness/draghi-report_en

16. Edler, J., & Georghiou, L. (2007). Public procurement and innovation—Resurrecting the demand side. *Research Policy, 36*(7), 949–963. https://doi.org/10.1016/j.respol.2007.03.003

17. European Commission. (2010). *Europe 2020: A strategy for smart, sustainable and inclusive growth* (COM/2010/2020 final). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52010DC2020

18. European Commission. (2019). *The European Green Deal*. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

19. European Commission. (2020a). *A new industrial strategy for Europe* (COM/2020/102 final). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0102

20. European Commission. (2020b). *An SME strategy for a sustainable and digital Europe* (COM/2020/103 final). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0103

21. European Commission. (2021a). *Strategic dependencies and capacities*. Publications Office of the European Union. https://op.europa.eu/

22. European Commission. (2021b). *Updating the 2020 new industrial strategy: Building a stronger Single Market for Europe's recovery* (COM/2021/350 final). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021DC0350

23. European Commission. (2021c). *Trade policy review: An open, sustainable and assertive trade strategy*

(COM/2021/66 final). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021DC0066

24. European Commission. (2022a). *European Chips Act*. https://digital-strategy.ec.europa.eu/en/policies/european-chips-act

25. European Commission. (2022b). *REPowerEU plan* (COM/2022/230 final). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52022DC0230

26. European Commission. (2023a). *An EU approach to enhance economic security* (JOIN/2023/20 final). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52023JC0020

27. European Commission. (2023b). *European economic security strategy* (JOIN/2023/20 final). https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-economic-security-strategy_en

28. European Commission. (2023c). *European Green Deal: Delivering on our climate objectives*. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

29. European Commission. (2025a). *A competitiveness compass for the EU* (COM/2025/30 final). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52025DC0030

30. European Commission. (2025b). *The Clean Industrial Deal: A joint roadmap for competitiveness and decarbonisation* (COM/2025/85 final). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52025DC0085

31. European Commission. (2025c). *Delivering on the Clean Industrial Deal I* (COM/2025/378 final). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52025DC0378

32. European Council. (2000). *Presidency conclusions: Lisbon European Council, 23 and 24 March 2000*. https://www.consilium.europa.eu/

33. European Council. (2022). *The Versailles declaration, 10–11 March 2022*. https://www.consilium.europa.eu/en/press/press-releases/2022/03/11/statement-of-the-members-of-the-european-council-10-11-march-2022/

34. European Parliament & Council of the European Union. (2023a). *Regulation (EU) 2023/956 of the European Parliament and of the Council of 10 May 2023 establishing a carbon border adjustment mechanism*. *Official Journal of the European Union, L 130*, 52–104. https://eur-lex.europa.eu/eli/reg/2023/956/oj

35. European Parliament & Council of the European Union. (2023b). *Regulation (EU) 2023/1781 of the European Parliament and of the Council of 13 September 2023 establishing a framework of measures for strengthening Europe's semiconductor ecosystem*. *Official Journal of the European Union, L 229*, 1–53. https://eur-lex.europa.eu/eli/reg/2023/1781/oj

36. European Parliament & Council of the European Union. (2024a). *Regulation (EU) 2024/1252 of the European Parliament and of the Council of 11 April 2024 establishing a framework for ensuring a secure and sustainable supply of critical raw materials*. *Official Journal of the European Union, L*. https://eur-lex.europa.eu/eli/reg/2024/1252/oj

37. European Parliament & Council of the European Union. (2024b). *Regulation (EU) 2024/1735 of the European Parliament and of the Council of 13 June 2024 on establishing a framework of measures for strengthening Europe's net-zero technology products manufacturing ecosystem*. *Official Journal of the European Union, L*. https://eur-lex.europa.eu/eli/reg/2024/1735/oj

38. Farrell, H., & Newman, A. L. (2019). Weaponized interdependence: How global economic networks shape state coercion. *International Security, 44*(1), 42–79. https://doi.org/10.1162/isec_a_00351

39. Freeman, C. (1987). *Technology policy and economic performance: Lessons from Japan*. Pinter Publishers. https://www.routledge.com/

40. Gereffi, G. (2018). *Global value chains and development: Redefining the contours of 21st century capitalism*. Cambridge University Press. https://doi.org/10.1017/9781316227930

41. Gereffi, G., Humphrey, J., & Sturgeon, T. (2005). The governance of global value chains. *Review of International Political Economy, 12*(1), 78–104. https://doi.org/10.1080/09692290500049805

42. Hoekman, B. (2022). *Rebooting multilateral trade cooperation: Perspectives from Europe*. CEPR Press. https://cepr.org/publications/books-and-reports/rebooting-multilateral-trade-cooperation

43. Hornkohl, L., & Pelekis, P. (2026). State aid and the European Union's industrial policy: From competition

control to industrial coordination. *Yearbook of European Law*. Advance online publication. https://doi.org/10.1093/yel/yeag004

44. International Energy Agency. (2022). *The role of critical minerals in clean energy transitions*. https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions

45. Johnson, C. (1982). *MITI and the Japanese miracle: The growth of industrial policy, 1925–1975*. Stanford University Press. https://www.sup.org/books/title/?id=2661

46. Kok, W., et al. (2004). *Facing the challenge: The Lisbon strategy for growth and employment*. European Communities. https://op.europa.eu/

47. Krugman, P. (1994). Competitiveness: A dangerous obsession. *Foreign Affairs, 73*(2), 28–44. https://doi.org/10.2307/20045917

48. Landesmann, M., & Stöllinger, R. (2020). The European Union: A developmental state? *Journal of Industry, Competition and Trade, 20*, 627–649. https://doi.org/10.1007/s10842-019-00330-3

49. Lundvall, B.-Å. (Ed.). (1992). *National systems of innovation: Towards a theory of innovation and interactive learning*. Pinter Publishers. https://www.routledge.com/

50. Mcnamara, Kathleen **"**Transforming Europe? The EU's industrial policy and geopolitical turn", *Journal of European Public Policy*,2024.

51. Majone, G. (1994). The rise of the regulatory state in Europe. *West European Politics, 17*(3), 77–101. https://doi.org/10.1080/01402389408425031

52. Majone, G. (1997). From the positive to the regulatory state: Causes and consequences of changes in the mode of governance. *Journal of Public Policy, 17*(2), 139–167. https://doi.org/10.1017/S0143814X00003524

53. Mazzucato, M. (2013). *The entrepreneurial state: Debunking public vs. private sector myths*. Anthem Press. https://anthempress.com/the-entrepreneurial-state-hb

54. Mazzucato, M. (2018). Mission-oriented innovation policies: Challenges and opportunities. *Industrial and Corporate Change, 27*(5), 803–815. https://doi.org/10.1093/icc/dty034

55. Meunier, S., & Nicolaïdis, K. (2006). The European Union as a conflicted trade power. *Journal of European Public Policy, 13*(6), 906–925. https://doi.org/10.1080/13501760600832623

56. Nelson, R. R. (Ed.). (1993). *National innovation systems: A comparative analysis*. Oxford University Press. https://global.oup.com/academic/

57. Pisani-Ferry, J. (2023). *The geopolitical consequences of the green transition*. European Council on Foreign Relations. https://ecfr.eu/publication/the-geopolitical-consequences-of-the-green-transition/

58. Porter, M. E. (1990). *The competitive advantage of nations*. Free Press. https://www.simonandschuster.com/

59. Rodrik, D. (2004). *Industrial policy for the twenty-first century* (John F. Kennedy School of Government Working Paper No. RWP04-047). Harvard University. https://drodrik.scholar.harvard.edu/publications/industrial-policy-twenty-first-century

60. Rodrik, D. (2004). *Industrial policy for the twenty-first century* (CEPR Discussion Paper No. 4767). Centre for Economic Policy Research. https://cepr.org/publications/dp4767

61. Schmitz, L., & Seidl, T. (2023). Asymmetric climate policies and the European Union's geoeconomic power. *Journal of European Public Policy, 30*(9), 1856–1881. https://doi.org/10.1080/13501763.2022.2142458

62. Schumpeter, J. A. (1942). *Capitalism, socialism and democracy*. Harper & Brothers. https://archive.org/details/capitalismsocial00schu

63. Tooze, A. (2021). *Europe's economic sovereignty and the geopolitics of industrial policy*. European Council on Foreign Relations. https://ecfr.eu/

64. World Trade Organization. (2023). *World trade report 2023: Re-globalization for a secure, inclusive and sustainable future*. https://www.wto.org/english/res_e/booksp_e/wtr23_e/wtr23_e.htm

65. Yellen, J. L. (2022, April 13). *Remarks by Secretary of the Treasury Janet L. Yellen on way forward for the global economy*. U.S. Department of the Treasury. https://home.treasury.gov/news/press-releases/jy1162

INTERNET SOURCES

European Commission — European Industrial Strategy

European Commission — Business and Industry

European Commission — Industry and the Green Deal

EUR-Lex — European Union Industrial Policy

Council of the EU — EU Industrial Policy

Council of the EU — Timeline of EU Industrial Policy

European Parliament — General Principles of EU Industrial Policy

European Parliament Research Service — Industrial Policy

European Parliament — Industrial Accelerator Act

European Commission — European Economic Security Strategy

European Commission — Competitiveness Compass

European Commission — Critical Raw Materials

European Commission — European Chips Act

EUR-Lex — Critical Raw Materials Act

EUR-Lex — Net-Zero Industry Act

OECD — Industrial Policy

Andrea Renda — What "North Star" for EU Industrial Policy?

CEPR/VoxEU — Recalibrating EU Industrial Policy

DATA BASES

Eurostat. (2025). *NACE Rev. 2.1: Statistical classification of economic activities in the European Union—2025 edition*. Publications Office of the European Union. https://doi.org/10.2785/155339
Eurostat: NACE Rev. 2.1 (2025 edition)

Eurostat. (2025). *NACE: Statistical classification of economic activities in the European Union*. European Commission.
Eurostat: NACE overview

European Commission. (2023). *Commission Delegated Regulation (EU) 2023/137 of 10 October 2022 amending Regulation (EC) No 1893/2006 establishing the statistical classification of economic activities NACE Revision 2*. Official Journal of the European Union.
EUR-Lex: NACE Revision 2.1 legislation

United Nations, Department of Economic and Social Affairs, Statistics Division. (2008). *International standard industrial classification of all economic activities (ISIC), Rev. 4*. United Nations.
UN Statistics Division: ISIC classification

United Nations, Department of Economic and Social Affairs, Statistics Division. (2025). *Introduction to ISIC Rev. 5*. United Nations.
UN Statistics Division: ISIC resources

Best universities on Industrial Policy

1. University of Sussex — SPRU

Probably one of the strongest choices globally for industrial policy itself. SPRU has a long tradition in innovation systems, technology policy, industrial development and the role of the state. Sussex currently offers a dedicated postgraduate Industrial and Innovation Policy module covering industrial-policy theory, intervention design, competitiveness, innovation and environmental transformation.

University of Sussex — SPRU

2. Harvard University

Particularly strong for development economics, industrial strategy, competitiveness and state intervention. The Harvard Kennedy School tradition around Dani Rodrik makes it especially relevant to the theoretical foundations of modern industrial policy.

Harvard Kennedy School

3. MIT

Excellent for the relationship between technology, innovation, manufacturing and industrial policy. MIT is particularly appropriate if your research moves toward technological capabilities, advanced manufacturing, semiconductors or innovation policy.

MIT — Industrial Performance Center

4. Stanford University

Strong for technology policy, innovation, entrepreneurship, industrial organisation and technological competitiveness.

Stanford University — Stanford Institute for Economic Policy Research

5. University of Oxford

Particularly strong for economic policy, industrial strategy, development, innovation and political economy. Oxford is especially useful if you want to combine industrial policy with broader questions of economic power and state capacity.

University of Oxford — Oxford Martin School

6. London School of Economics and Political Science

For EU industrial policy and political economy, LSE is one of the strongest choices. Its European Institute is directly involved in current research on the transformation of EU industrial policy. A 2026 *Governance* special issue led by LSE researchers explicitly describes the movement from the EU's traditional regulatory state toward a transformational state.

LSE European Institute

7. University of Cambridge

Very strong for industrial organisation, innovation, technology, productivity and economic development, with particular relevance to the intellectual tradition surrounding evolutionary economics and technological change.

University of Cambridge — Cambridge Judge Business School

8. University of California, Berkeley

Strong for industrial organisation, innovation, economic development, regulation and political economy, particularly if you want a US comparative perspective.

UC Berkeley — Energy Institute

EU

1. LSE GB

Best for: EU political economy, regulatory state → transformational state, economic governance, geoeconomics.

This is probably one of the closest matches to your theoretical argument. Current LSE research explicitly examines the resurgence of industrial policy and the EU's movement away from its traditional regulatory model.

LSE European Institute

2. University of Sussex GB

Best for: industrial policy theory, innovation systems, technology policy and industrial development.

For the theoretical framework of your essay, Sussex/SPRU may actually be more directly relevant than almost any European institution.

SPRU — University of Sussex

3. Bocconi University IT

Best for: EU industrial policy, competitiveness, economic governance, industrial organisation and European economic policymaking.

Bocconi's Institute for European Policymaking has an explicit research programme on the future of EU industrial policy, including the interaction between industrial policy, competitiveness, green transition and common European investment.

Bocconi — Institute for European Policymaking

4. Maastricht University NL

Best for: EU industrial policy + competition law + strategic autonomy + innovation policy.

This is particularly relevant to your Article 173 TFEU / competition policy / strategic autonomy argument. Maastricht researchers explicitly examine the tension between industrial policy, competition policy and strategic autonomy.

Maastricht University — Industrial Policy Research

5. VUB — Vrije Universiteit Brussel BE

Best for: EU industrial policy, strategic autonomy, geoeconomics and EU economic governance.

This is particularly relevant if you are interested in Brussels and EU institutions. VUB currently has a research project specifically examining industrial policy as a lever for EU strategic autonomy, including the geopolitical, economic and legal dimensions of the new industrial-policy environment.

VUB — Industrial Policy and Strategic Autonomy Research Project

6. University of Bologna IT

Strong for EU political economy, industrial policy,

economic governance and European integration.

It is also represented in recent debates on the future of European industrial policy alongside Bocconi and other major European institutions.

University of Bologna

7. Utrecht University NL

Especially interesting for competition law, State aid and industrial policy. Utrecht researchers are involved in current work examining the relationship between EU State aid law, industrial strategy and global economic change.

Utrecht University

8. University of Reading GB

Interesting for empirical work on when industrial policy succeeds or fails. Recent research examines how industrial structures, institutional arrangements and firm capabilities affect industrial-policy outcomes.

University of Reading